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January 1971

TO THE HONORABLE MEMBERS OF THE CITY PLANNING COMMISSION:

The accompanying report, Transportation: Conditions, Problems and Issues, represents a survey of transportation conditions in San Francisco, perhaps the most comprehensive report on the subject done for many years.

This report includes the data, analysis of problems and presentation of issues required for preparation of an amended Transportation Section of the Master Plan to be presented for citizen review and adoption later this year. It is thus similar to the background reports on housing prepared for the Improvement Plan for Residence.

Planning for transportation is a primary responsibility of the Department. This report represents the effort of the staff to carry out part of this responsibility by collecting, analyzing and presenting to the public available information on transportation conditions and problems in the city. The primary emphasis is on the issues which are involved in transportation planning, especially insofar as transportation relates to other aspects of comprehensive planning, and the choices available to the City in improving the transportation system.

We hope that the report will serve as a valuable guide both for the preparation of an Improvement Plan for Transportation and for discussion by citizens, other public agencies, and interested groups of that plan.

Sincerely,

Allan B. Jacobs

Allan B. Jacobs
Director of Planning

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Summary

The San Francisco Department of City Planning has prepared a report on transportation in San Francisco to provide an informational and analytical basis for revision of the Transportation Section of the San Francisco Master Plan. The report presents, within the limits of available data, a review of existing conditions and problems in the movement of people. Data from a number of recent traffic and transportation studies have been assembled, analyzed and interpreted. Special attention has been given to the effect of alternative transportation decisions on future travel and the relationship between transportation and other aspects of city life.

THE IMPORTANCE OF TRANSPORTATION

A key element in the existence of cities is the transportation system, which links together districts in the city, the city with the region and the region with the nation. The most important function of transportation is to make possible the many activities in which men engage at different places: working and resting, raising a family, meeting other people, buying and selling, learning and playing. A good transportation system also expands choices among residential environments, jobs, recreational pursuits, social contacts, consumer goods, and educational resources. An additional function of transportation is the provision of pleasure.

The Relationship of Transportation to City Life and Urban Form

A transportation system is a dominant feature in the physical, social and economic life of a city. The modes of transportation used, as well as the location of routes and design of the system, influence the nature of urban culture and the physical organization of the city. For this reason the interrelationships between a transportation system and other elements of urban structure must be carefully considered in transportation planning.

Historically, the nature of transportation technology and organization has had a tremendous influence on patterns of urban development. Today in highly developed cities the difference is that changes in the transportation system are

often more disruptive to existing patterns than productive to wholly new development. Since only a small fraction of all the public services and facilities required by residents can be provided within walking distance, the transportation system is an essential element in providing access to these services. The design, type and cost of transportation influence the quality of access provided.

An expanded transportation network brings wider opportunities. Most residents may now choose their jobs or homes without changing the other, take advantage of a variety of recreational opportunities, and have many acquaintances throughout a large region. For the disadvantaged members of society, the adequacy of the transportation remains a key element in providing access to improved educational, social and work opportunities.

An efficient transportation system for goods and passenger movement is an essential ingredient in a healthy economic environment. Congestion can mean a loss of valuable time and a waste of economic resources, although it may also be the sign of a healthy and prosperous economy. The continued vitality of downtown San Francisco as a center of specialized regional economic activity depends on an efficient transportation system.

Transportation systems can either encourage or destroy patterns of community association and neighborhood identity, and thus contribute to or hurt social and environmental stability. As the strong sense of social community has declined because of increased social mobility, the physical identity of neighborhoods may have become a new source of stability and cohesion. Changes in the transportation which destroy this physical integrity can have serious effects.

Different modes of transportation have differing qualities with respect to safety, convenience, and comfort in traveling, and even health. Heavy traffic and high speed travel increase accident hazards. Convenience varies according to the amount of congestion, frequency of service, and directness of travel. Overcrowding in public transportation and parking problems for drivers are sources of inconvenience and discomfort.

Various transportation modes and networks have different effects on the quality of the environment. Gasoline-powered automobiles and buses pollute the air. Noise is a special problem for San Francisco residents because of the rugged topography requiring frequent acceleration and deceleration. Elevated structures block views, eliminate light at street levels, and contribute to imbalance in the sense of scale

of the physical structure of the city. This is especially a problem in San Francisco where small-scale organization and views are important ingredients of the quality of the environment.

The Urban Transportation Problem

The nature of urban functions, the structure of cities, and patterns of urban activity lead to special transportation problems in cities. Most of these problems arise out of the nature of urban life itself; choices among solutions must be based on available alternatives and the values held by city residents. Four basic problems define the kinds of alternatives available, the advantages and disadvantages of different modes of transportation for varying needs, and the way in which transportation problems meld with other urban problems.

The most visible problem in urban transportation is that caused by the desire of large numbers of people to move at the same times to the same places. It is an illustration of the function of the city in bringing people together to do what they could not do separately. Much of the attractiveness of the city consists of those activities which require support from large numbers of people. Downtown San Francisco is the desired object of more travel than any other location.

Since proximity among activities is the major reason for being of the city, the most valuable resource is space. A good transportation system uses as little space as possible for moving people in order to reserve as large an amount as possible for the activities to which people want access. Little vacant land is available in San Francisco. Therefore attempts are made to create "new" space by tunneling or building elevated structures. Some modes of transportation require more space than others proportional to their capacity to move people. Automobiles have very high space consumption per person trip. Rapid transit has very low requirements in relation to capacity.

Urban populations are diverse in their cultures, types of work, life styles and values. If such diversity is to be maintained, the transportation system must provide for the needs of all the population. The elderly and youth, the poor and the handicapped have special needs. For most residents the automobile has made possible greater access to opportunities. On the other hand, where private transportation is relied on, those who need public transportation are deprived of the same opportunities. Public transportation can only reasonably be provided if it is used by many.

A major concern of physical organization posed for urban transportation is the problem of providing for movement among many scattered points at which people want to begin and end their trips. The automobile is more suited to linking this multiplicity of locations than any other mode, but it also contributes to this form of physical organization, making it more difficult to provide other means of travel. For San Franciscans this is not as severe a problem as in other areas. The city is relatively compact and densely developed. As a result there is potential demand for a good system of mass transit.

PLANNING FOR TRANSPORTATION IN SAN FRANCISCO

The specific requirements for an adequate transportation system and the possibilities for providing it are determined by the social, physical and economic factors peculiar to each city and its region. Past planning and resident attitudes are also important factors.

Since San Francisco and adjacent counties are already intensively developed, few opportunities exist for drastic changes in transportation networks or facilities. The existing transportation system must, therefore, be seen as a basis upon which to build additional facilities and provide new services for present and future needs.

Past Planning, Resident Attitudes and Current Policy

Community debate over the past twenty years in San Francisco focused primarily on the issue of freeways in the city. At present City policy is that no new freeways will be built through residential areas, except possibly for one to be tunneled. This policy conditions future planning. At the same time, the City is committed to BART for commuter travel from the suburbs. Present controversy centers on the appropriate thoroughfare system for the city and residents have expressed opposition to any proposal which has a deleterious effect on the quality of their neighborhoods.

The Regional Setting: Present and Future

San Francisco is part of a growing metropolitan area. The role and location of the city provides a setting for local decisions. Access to the city is constrained by its location on the tip of a peninsula. The Bay acts as a barrier to easy access from the North and East Bay.

The nine-county Bay Area is expected to increase in population by over three million persons by 1990 with

employment expected to increase at an even more rapid rate. The region is functioning increasingly as an interrelated economic entity with more goods and services consumed within the area. As a result a greater proportion of workers are employed outside their counties of residence than before. This trend is significant for San Francisco because almost half of all Bay Area residents working outside their own counties work in the city. Decentralization of job opportunities, especially in manufacturing, is creating problems for semi-skilled and low-skilled residents of central cities.

There are about seventeen agencies in the Bay Area that build or operate various types of transportation. In addition, many ad hoc entities are established on occasion to perform special studies. The number of agencies involved in planning and operation makes coordination and comprehensive planning difficult. The essential problem is to find a means to combine overall regional planning with local control over transportation matters seriously affecting each locality.

Local Factors for Transportation Planning

The strongest defining features of San Francisco are the hills and water. The hills constrain access among parts of the city, while providing ideal sites for homes. The topography also creates separate identities for many neighborhoods where small-scale development, low heights and continuity of architectural character are predominant.

The city is predominantly residential in land use, with large amounts of housing even within the commercial and industrial districts. Neighborhood-supporting uses are frequently within walking distance and major employment and commerce are located in relatively compact areas. Almost all industrial development is located on the eastern lowlands along the Bay. Downtown contains the bulk of non-industrial employment. Residential densities are highest in the northeast section of the city and lowest southwest of Twin Peaks. Much of the housing stock consists of small units in large apartment buildings which are not preferred by families. This fact, in combination with growing employment, is encouraging an increase in commuting to work. Little opportunity exists in the city for large new residential developments.

Population has declined since 1960 and is expected to remain stable. Increasing numbers, however, will be in the younger and older age groups. Growing diversity in the composition of the population by age, income and living characteristics will increase the varieties of transportation demand.

The economic structure of the city is also changing, away from manufacturing as its base to services -- finance, government, real estate, and business services. Employment has been growing at an average annual rate of over 5,000 new jobs. Because the resident labor force has declined and commuting out to work has increased, commuting into the city has grown more rapidly. It increased 50 percent between 1960 and 1965. Over the next twenty years commuting into the city is expected to increase by almost 100 percent, or by 170,000 persons. At the same time, the growing mismatch between population and job characteristics will increase demand for resident access to blue-collar jobs outside the city.

PRESENT AND FUTURE TRAVEL PATTERNS

Downtown is the most critical transportation area in San Francisco. It contains not only substantial employment but also specialized shopping and entertainment facilities, government offices, hotels and tourist attractions. Problems also exist outside of downtown, however, due to the large number of nonresident trips made to other parts of the city, the concentration of employment in certain areas, and the increase in travel for shopping, recreation, and personal business by residents in all parts of the city.

Downtown-Oriented Travel

Over 350,000 people come to downtown from other parts of the city and metropolitan area each weekday. Sixty-two percent of the trips are to work and most of these are made during the morning and afternoon peak periods. Since almost half of all persons attracted to downtown leave during the afternoon peak period, this movement causes a serious strain on transportation facilities. Forty-three percent of all trips to work in downtown are made by commuters from surrounding counties. Whereas 44 percent of trips by city residents are for non-work purposes, only 28 percent of nonresident trips to downtown are not for work.

Fifty-nine percent of all trips to downtown are made by automobile and 41 percent by public transit. Transit use by residents is higher than that for nonresidents. During the afternoon peak period 52 percent of all trips outbound from downtown are by public transit. City residents make 58 percent of these trips by transit, while nonresidents use automobiles to a greater extent during this period.

Travel is apportioned relatively equally among the major directions of movement. The largest amount of travel to and from downtown occurs in the southerly direction, where movements generated by Peninsula residents and residents of the Mission-Bayshore corridor combine. Transit use is lowest among city corridors in the Mission-Bayshore and highest in the Twin Peaks-Sunset corridor, a reflection of existing transit facilities.

If adequate transportation facilities are made available, downtown employment is expected to grow by 105,000 jobs between 1970 and 1990. Since the city's labor force is not expected to grow substantially, the number of nonresidents commuting to downtown will increase by about the same amount. Given the current modal split, as many as 30,000 additional automobiles would be attempting to enter and leave downtown during the peak periods. BART is expected to provide the additional capacity to handle trips generated in the East Bay. However, serious problems will continue for Peninsula and North Bay commuters.

Trips to downtown for non-work purposes will experience an increase related to growth in leisure time, incomes, and general mobility. If downtown employment grows as expected, a certain proportional increase in non-work attractions is likely. Any solution to the problem of increasing work trips, however, will involve an increase in downtown access capacity that should be more than sufficient to accommodate additional non-work trips.

Non-Downtown Travel

Although downtown represents the single most critical problem in terms of the capacity of present facilities to handle projected travel demand, more total travel occurs in the rest of the city. This travel is generated by both residents and nonresidents seeking to travel to outlying employment and non-work activities.

Fifty-six percent of nonresident weekday trips to the city are to non-downtown destinations. Almost half of these are to employment. In contrast to travel to downtown, over 90 percent of all non-downtown trips by nonresidents are by automobile, contributing greatly to congestion on the bridges and major routes into the city. Sixty percent of these trips are made by Peninsula residents, who travel primarily to the Mission-Bayshore corridor. Most East Bay and North Bay residents travel to the Marina and Richmond-Western Addition corridors.

Since most employment in the city outside of downtown is in the Mission-Bayshore and Richmond-Western Addition corridors, most travel to work outside of downtown by residents is to these corridors. Three-fourths travel to work by automobile. About 13 percent of residents commute out to suburban employment locations, chiefly in the Peninsula and East Bay. Over 90 percent of this travel is by automobile. Commuting out has been increasing rapidly.

About 75 percent of daily trips made by residents are not to or from employment. They include travel for shopping, recreation, entertainment, medical attention, banking, and a variety of other purposes. One-third of these trips are made within areas in which residents live, not including travel on foot. Significant interdistrict movements occur to major recreational, medical and shopping facilities in the Inner Richmond, Western Addition and North Beach. On weekends a substantial number of residents travel to Marin County for recreation. Automobiles are used for almost all non-work trips outside of downtown, except for school trips. Non-work trips are expected to increase more rapidly than work trips, generating more traffic throughout the city, if current trends in modal split continue.

Vehicular traffic resulting from automobile use for non-downtown travel is found concentrated primarily on streets in the Western Addition, North Beach, and Mission districts, which border downtown. The presence of this traffic adds to congestion caused by downtown-oriented travel and causes serious environmental problems for residential neighborhoods in these areas. Future trends in non-downtown employment and in non-work travel portend an increase in traffic unless transit service is improved.

IMPLICATIONS FOR PLANNING

Analysis of existing and projected travel patterns, when seen in the context of the existing transportation system, suggests several transportation problems. When these problems are related to other goals and objectives of the City, several major issues are raised for discussion.

Trends and Assumptions

Future trends can be separated into two types: those substantially independent of transportation decisions and those whose occurrence is dependent on certain transportation decisions. Total regional population and economic growth are assumed to occur as projected without regard to changes in the transportation system, although other

decisions by government may modify the trends. On the other hand, the distribution of population and economic activities may be seen as substantially dependent on transportation, both in San Francisco and the region. On the assumption that all necessary facilities are provided, San Francisco's population is expected to remain stable whereas employment is expected to increase dramatically. This will mean additional commuters. Growth in income and leisure time for residents is expected to increase the demand for travel for non-work purposes, while travel to employment will remain stable or perhaps decline somewhat. The pattern of downtown growth will be determined in part by future transportation decisions and economic opportunities for residents and characteristics of the resident population will be influenced by the future transportation system.

Choices Among Futures

Existing and future travel patterns raise three basic issues for the city regarding the presence and function of automobiles in the city, the future growth of downtown, and economic mobility for the most disadvantaged city residents.

Projected growth in commuting to the city requires that a choice be made with respect to the level of growth desired and the way in which increased travel will be provided for. Highway links with the three suburban corridors are presently saturated during commuter peak periods. If new commuters are to come to the city, new facilities will have to be provided. Enormous cost in monetary and environmental terms will be incurred, especially if they are to come by automobile. Heavy automobile traffic is already causing serious environmental problems in residential areas of the city encircling downtown and in downtown. There are too few nonresidential streets to provide for the traffic which already exists.

Increasing non-work travel by residents will also mean increased automobile traffic if current conditions continue. This will mean a need for wider streets, and the possibility of declines in the quality of the residential environment.

The alternative is to improve transit to the extent possible to accommodate as much as possible of increased demand. Reductions in present levels of automobile traffic will be unlikely so that diverting new travel to transit will be all the more necessary.

The city is committed to a cohesive and compact downtown. In order to carry out this commitment it will be

necessary to plan new terminals, transit routes, street and sidewalk improvements and parking facilities in accordance with that objective.

The economic vitality of downtown is dependent on physical proximity among activities. Therefore, pedestrian and short-distance transit systems should be given priority in servicing intradowntown transportation needs. New rapid transit stops in particular should be located where new concentrated growth is desired in relation to the existing core.

The poor, the elderly, youth and the handicapped will increasingly need better public transportation service at prices they can afford in order to achieve the opportunities and mobility comparable to those now offered the automobile owner. As semi-skilled and low-skilled job opportunities in the city decline, it will be increasingly necessary for residents requiring such work to have access to them in surrounding counties. It is unlikely that substantial numbers of these residents will be able to find adequate housing at reasonable prices in the suburbs. Nor will transportation in outlying counties be adequate to the task of providing access to jobs and necessary services. Social and economic mobility will require improved public transit services in San Francisco and from San Francisco to other major employment centers.

In summary, the city faces a choice between two futures: a future in which the city is changed radically to conform to a particular transportation system or one in which the transportation system is changed to conform to the kind of city in which residents want to work, live and play.

Introduction

PURPOSE OF THE REPORT

This report on transportation conditions, problems, and issues in San Francisco has been prepared to provide an informational and analytical basis for revision of the Transportation Section of the San Francisco Master Plan. It is thus a major product of the planning-development process which involves revision of the Master Plan. The report will be used by the Department of City Planning as a basis for preparing the Improvement Plan for Transportation, which will include a unified set of basic objectives and policies for this element of the Master Plan. The present volume will also serve as a basis for review by citizens and other government agencies of the plan to be proposed.

SCOPE AND CONTENT

This report presents, within the limits of available data, a review of existing conditions and problems in the movement of people in San Francisco and the Bay Area. The focus is on movement by automobiles and public transit as primary modes of travel. Some attention has been given to the possibilities for use of air and water travel and their requirements.

The report begins with a general discussion of the importance of transportation in urban life, the interaction between transportation systems and urban activities, the functions which transportation serves, the characteristics of transportation modes and systems, and the nature of urban transportation problems.

Chapter II outlines the regional and local factors which set the context for transportation planning in San Francisco: agencies involved in transportation planning and management, the resources available for financing and improving transportation networks, topography, and land use patterns. Particular attention is paid to the role of the city in the region as an economic, social, and cultural center of activity.

The third chapter describes the kinds and quality of transportation facilities and services now or soon to be available.

Chapter IV presents information on existing travel patterns within the city and region, projected travel demands and future trends based on existing and committed facilities and policies.

Finally, in the last chapter, the implications of the preceding information are stated in terms of the problems faced by the City now and in the future, the choices it faces in planning for transportation, and the impact of alternative solutions on other City objectives and policies.

DATA SOURCES AND ANALYTICAL APPROACH

A major effort has been made to assemble, analyze and interpret data from a number of recent traffic, transportation, and other studies as a means of defining transportation problems for San Francisco, clarifying current issues, and establishing the basic assumptions upon which San Francisco's transportation policies and plans can be built. Where available data have been inadequate for a thorough consideration of problems and issues, an attempt has been made to establish the range of choices open to the City based on theoretical and empirical knowledge.

The studies which have served as a basis for information on present and future travel patterns are described in Appendix B. In addition to published studies, much information was obtained from various transportation agencies in the area. An attempt has been made in the analysis of existing travel patterns and projection of future trends to consider the effect of alternative decisions with respect to available means and levels of transportation. Special attention is also given to the effect of such decisions on other goals and objectives of the City.

The Importance of Transportation

A key element in the existence of cities is the transportation system. Cities function as interchanges in vast networks of transportation and communication, where commodities and services are traded, ideas exchanged, and social relationships established. The webs formed by the various networks of transportation link together districts in the city, the city with the metropolitan area, and the metropolitan area with the nation and the world.

THE FUNCTIONS OF TRANSPORTATION

The most important of transportation functions is linkage of the many activities in which men engage at different places: working and resting, raising a family, meeting other people, attending cultural events, buying and selling, learning and playing. For the individual, a good transportation system allows him to visit friends, get to work, or see a movie. For a business firm, a good transportation system provides for ready access by suppliers, customers, and employees, contact with necessary business services, efficient and low-cost delivery and distribution of goods which are used by businesses and individuals alike.

For almost everyone a good transportation system also expands choices among alternative residential environments, jobs, recreational pursuits, social contacts, consumer goods, and educational resources.

From this expansion of choices may arise greater human opportunities, at least until that point when the means dominates the ends. This may happen if the transportation system reduces choices by eliminating the activities to which people wanted access. As Gertrude Stein's captious remark "There is no there there" suggests, "getting there" becomes less important when there is nothing left "there".

An additional but often neglected function of the transportation system is the provision of pleasure. Scenic drives, bicycling, and walks through parks are obvious examples. When the transportation system serves this function, efficiency and speed of movement are less important attributes; the interest is in comfort, pleasant views, an attractive atmosphere, and perhaps a unique form of movement.

THE RELATIONSHIP OF TRANSPORTATION TO URBAN LIFE

A transportation system is a dominant feature in the physical, social, and economic life of a city. The modes of transportation used, as well as the location of routes and the design of the system, greatly influence the nature of urban culture and the physical organization of the city. For this reason the interrelationships between a transportation system and other elements of urban structure must be carefully considered in planning for transportation. While transportation decisions cannot provide remedies for most urban problems or determine alone the nature of the city, they do influence other decisions, both public and private, affecting housing, recreation, public services and facilities, economic stability and growth. The significance of these effects can easily be seen in the historical development of cities, in constantly changing patterns of development and land use, in neighborhood identity and cohesiveness, and in the quality of the environment. Less obvious effects can be observed in other areas of urban life.

DEVELOPMENT PATTERNS AND LAND USES

Historically, the nature of transportation technology and network organization has had a tremendous influence on patterns of urban development and land use. Although changes in transportation in developed urban areas have less effect now because of the relative permanence of physical structures and established patterns of activity, interrelationships between transportation and development patterns are still observable and must be taken into account. The problem today in cities is that changes in transportation modes and networks are more disruptive of existing patterns than productive of wholly new development.

Since most persons and firms attempt to minimize the distance (or time-distance) to be overcome between desired activities, the nature of the transportation system is a fundamental element in determining where such activities will locate. Each resident in the city chooses where he wants to live at least partly on the basis of accessibility to places of employment, shopping, recreation, public facilities and services. Even other factors influencing the choice of a home, such as quiet, safety from physical harm, and sense of community in the neighborhood are influenced by the nature of the transportation system. Better access within the city compared to that between the city and other parts of the region can encourage employees to live within the city; improved access to other parts of the Bay region will encourage commuting. While the design of a transportation

system is not determinate of these trends, it has a major influence.

Business firms are even more sensitive to transportation in choice of location than residents. Many of them must be located so as to draw on a large number of consumers. The more specialized the firm, the greater must be its accessibility to a large segment of the population. The effect of this factor is observable in the concentration of specialized stores and businesses in central areas, such as downtown San Francisco, which are highly accessible by various modes of transportation from all parts of the city and the metropolitan area. Businesses requiring a smaller potential population may locate at major intersections of streets and transit lines and along arterial routes.

Residential development patterns have also followed the pattern of transportation development. Higher residential densities are usually to be found near major centers of transportation networks or along major routes. Densities decline as one moves further from major streets and transit lines. The development of San Francisco has followed this pattern. The area west of Twin Peaks was only developed intensely for residential use when transit lines were extended beyond the hills. Other changes occur, sometimes unnoticed. As the growing dominance of the automobile has led to decline in transit usage and reduced reliance on walking, homes as well as commercial facilities and services have been located in new patterns.

The net effect in general of transportation is to affect the density and distribution of all space-using activities. Proximity to transportation encourages more intensive use of land, especially by those uses which attach a priority to such locations. Development, in short, depends on the transportation system.

ACCESS TO INSTITUTIONAL AND PUBLIC FACILITIES AND SERVICES

The transportation system is as essential an element in providing access to public services and facilities as it is in linking people to commercial transactions. Only a small fraction of all the public services and facilities needed by residents can be provided within walking distance. Some specialized medical, cultural, and recreational facilities can be provided only for a very large population, perhaps an entire city or region. As a result, no single location for such an activity can be near even a majority of the population. A full range of social services cannot be provided near every residence, nor can a full range of recreational

or cultural opportunities.

The design of the transportation network significantly affects access to public facilities, as does the type and cost of transportation available. One type of transportation network may maximize access to a central location, another to a group of decentralized service centers. Each may also serve the needs of different groups.

SOCIAL AND ECONOMIC MOBILITY

The transportation system can encourage or discourage opportunities for varied social contacts, sources of employment, and educational advancement. In the past, limited transportation alternatives restricted many people to opportunities offered within a relatively limited geographic area. As a consequence, social contacts were primarily limited to those in one's neighborhood, education to the local school, and employment to local industry. With an expanded transportation network and improved modes of travel, expanded opportunities have also come. Most residents may now choose their jobs or homes without changing the other, take advantage of a variety of recreational opportunities without making an extended trip, and have many acquaintances throughout a large region. This has been made possible largely by the automobile but also by forms of public transportation.

For the disadvantaged members of society, however, the adequacy of the transportation system remains a key element in providing them with an expanded horizon. A transportation system poorly adapted to the needs of the poor can make difficult, if not impossible, access to improved educational, social, and work opportunities.

BUSINESS AND THE ECONOMY

Although many economic activities are less dependent today on proximity to major transportation routes than in the past, the efficiency of an urban transportation system for both goods and passenger movement is still an essential ingredient in a healthy economic environment. Congestion can mean a loss of valuable time and a waste of economic resources, although it may also be the sign of a healthy and prosperous economy.

The nature of the local economy is also substantially influenced by its links with the regional and national economy. These necessary links are made by communication and transportation networks. The continued vitality of

downtown San Francisco as a center of specialized regional economic activity is dependent on a transportation system which provides rapid and comfortable access from other parts of the region and the nation. The nature of future downtown economic activity will be influenced in part by the kind of transportation system available.

COMMUNITY COHESION AND IDENTITY

Transportation systems can either encourage or destroy patterns of community association and neighborhood physical identity, and thus contribute to or undermine social and environmental stability. Major changes in transportation patterns within established communities, such as the construction of a freeway or a transit line, almost always affect community identity and social composition. A freeway can split a neighborhood, socially as well as physically. A new transit line can effect a more subtle change by leading to new occupancy patterns or activities. Changes in the overall network of facilities alter patterns of accessibility among various activities. In one case the change may cause increased competition for residence or business location; in another, isolation of the neighborhood from the rest of the city, reducing the accessibility and attractiveness of that neighborhood.

In the past, neighborhoods had relatively strong senses of identity because most residents lived there for long periods. The increased accessibility and personal resources afforded most city residents may have the opposite effect, eliminating any sense of social identity for a particular neighborhood. Conversely, where accessibility and resources remain low, the combination of enforced social homogeneity and limited access to the rest of the city becomes destructive of stable and cohesive communities.

As the strong sense of social community in areas of the city has declined because of increased social mobility, the physical identity of the neighborhood may have become a new source of stability and cohesion. Changes in the transportation system which destroy this physical integrity can have serious effects.

PUBLIC SAFETY, CONVENIENCE, COMFORT, AND HEALTH

Different modes of transportation have differing qualities with respect to safety, convenience, and comfort in traveling, and even health. High volumes of traffic increase the hazard both to occupants of vehicles and to pedestrians

on the street. Where travel is at high speed, the danger to life is most acute. For this reason rapid rail transit is almost always on exclusive rights of way. Heavy traffic also has the more subtle effect of making streets more dangerous in other ways because it reduces the amount of pedestrian activity and care of the street, thus reducing the presence of people who would help prevent crime.

The convenience of travel among various locations varies according to the mode. The automobile has the advantage of being constantly on call. It has the disadvantage that it must be stored at all origins and destinations. Public transportation which is infrequent in service and offers few connections among many points is inconvenient for travelers and will be shunned. Its satisfaction of needs is dependent primarily on the frequency with which vehicles pass a stop where people want it, the speed with which the passenger may reach his destination, and the number of transfers required to get there.

Some forms of transportation are more comfortable than others, given traditional designs. Constant starts and stops and intolerable levels of acceleration and deceleration contribute to discomfort in any mode of travel. Pleasure and comfort are often enhanced by freedom from responsibility for operation, ability to look at what is around, and possibilities for stopping without having to find a parking place. Discomfort and inconvenience are caused by inability to sit down, long waits, and overcrowded conditions in public transportation.

ENVIRONMENTAL QUALITY

Various transportation modes and networks have different effects on the quality of the environment. Gasoline-powered automobiles and buses pollute the air and substantially increase noise levels. Increased noise levels can make residential areas unattractive to residents.[1] Noise is a special problem in San Francisco because the nature of the topography leads to increasing noise from gas engines required to accelerate or decelerate in traversing hills. Air pollution not only harms health but increases overall discomfort and diminishes the pleasure of being outdoors. While overhead-line electric buses reduce pollution and noise, they contribute to visual clutter.

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[1] San Francisco Department of City Planning, Street Livability Study, June, 1970.

The existence of visible fixed rights-of-way, as in the case of streetcars, contributes to visual orientation within the city and ease of finding one's way.[1] Elevated structures for any transportation mode block views and eliminate light at street level and for adjacent buildings. They also may contribute to imbalance in the sense of scale of the physical structure of the city. This is especially a problem in San Francisco where views and small-scale organization are important ingredients of the quality of the environment.

Many problems of impact on the environment of alternative methods of transportation are questions of design rather than of characteristics of the particular mode, apart from the specific problems of the gas-powered engine mentioned above. Freeways and rail transit may be depressed to avoid undesirable visual conflicts, noise, and air pollution problems to some extent. Pollution can be avoided by using different means of locomotion or improving control devices. Noise can be baffled to some extent by landscaping of streets. Pedestrian and vehicular movement may be separated into different levels in order to avoid conflicts between them.

In a city like San Francisco, the characteristics of some modes, regardless of design, will always have a disruptive effect on existing patterns of activity. Residences built at a time when traffic volumes were low may be too close to the street to avoid the adverse impact of heavier traffic. Parking will always be required where automobiles are used, and parking structures occupy space which might be used for other activities. And finally, some forms of movement are more pleasant than others, contributing to the pleasure of being in and moving through the city. While scenic trips by car in the country are a recognized form of recreation, pleasure travel in the city could be as well.

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[1]San Francisco Department of City Planning, Existing Form and Image (Urban Design Preliminary Report No. 4), Chapter III, January, 1970.

THE NATURE OF THE URBAN TRANSPORTATION PROBLEM

The interrelationships between transportation systems and other important elements of urban life necessitate the development of a transportation system which will further overall community goals. The nature of urban functions, the structure of cities, and patterns of urban activity lead to special problems for transportation in cities. Most of these problems arise out of the nature of urban life itself; choices among solutions to them must be based on a view of available alternatives and the values held by city residents.

To be noted at the outset is the potential conflict between the functions of cities themselves and transportation systems. There is a fundamental similarity of purpose between them: both expand the individual's horizon of opportunities. However, the two approaches may be in irreconcilable conflict.[1] The city provides an expanded scope of potential for work, recreation, culture, and social contacts by bringing people together and putting activities in close proximity. Modern means of transportation do the same thing by increasing the individual's mobility to overcome distances. This conflict between the means may be equivalent to a conflict between other values and objectives.

A good urban transportation system does more than provide efficient transportation with minimum damage to the urban environment. Its potential is to make available to all elements of the citizenry the ability to reach, easily, destinations for all types of objectives. At the same time, it must be planned and operated in such a way that it does not destroy those elements of urban life which contribute to the satisfaction of those objectives. It must complement, rather than destroy, the contribution of cities to personal satisfaction.

With transportation planning seen within the broader context of overall community objectives and problems, it is useful to identify four problems peculiar to urban transportation today. These problems define the kinds of alternatives available, the advantages and disadvantages of different modes of transportation for varying needs, and the way in which transportation problems meld with other problems of urban

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[1] Owen, Wilfred, A Transport Program for the Cities. A report to the Brookings Institution and the Ford Foundation, August, 1968, Washington, D. C.

life. They are identified as (1) the problem of togetherness, (2) the problem of space scarcity, (3) the problem of various needs and wants, and (4) the problem of multiple origins and destinations.

THE PROBLEM OF TOGETHERNESS

Perhaps the most visible problem in urban transportation today is that caused by the desire of large numbers of people to move at the same times to the same places. This is most obvious in the case of the work trips between outlying residential areas to downtown San Francisco. This problem also occurs in the case of weekend recreational travel and trips to special events. This is an illustration of the conflict between the function of the city in bringing people together at the same places at the same times, in order to do together what they could not do separately, and the means of getting them there. While to some extent the problem of peak-hour movements is artificially created by rigidity in work routines and other forms of scheduling, much of the attractiveness of the city consists of those activities which can only exist if large numbers of people come together to support them. A baseball game or an opera cannot be held for twenty or even two hundred people. Downtown business cannot survive without attaining a certain level of economic agglomeration.

While it is possible to designate with some reliability the degree of economic growth and mix which the city desires, any choice will always involve bringing people together in large numbers because their togetherness makes possible the existence of a city. Amost a half million people enter or pass through downtown San Francisco daily. The convenience of downtown is a function of the number of activities provided within a compact area. A transportation system which does not make possible access to downtown rapidly for large numbers of people and convenient movement within downtown will hinder its functioning.

THE PROBLEM OF SCARCITY OF SPACE

The most valuable and scarce resource in cities is space; this is so because proximity among activities is the major reason for being of the city. Thus, the problem of competition for space is related to the problem of togetherness. A good transportation system uses as little space as possible for moving people in order to reserve as large an amount as possible for the activities which take place in the city.

The construction of elevated freeways and transit subways is an illustration of attempts to find space where little is available for adding capacity to the transportation system. Because San Francisco is densely developed, little land is available without the demolition of buildings or transfers of public rights-of-way from one mode of travel to another. This creates a problem of major dimensions and costs where it is desirable to expand capacity. However, some modes of transportation require less space than others proportional to their capacity to move people. Automobiles have a very high space consumption per person trip for movement and storage. Rapid transit has low requirements in relation to movement capacity. Where added capacity for automobile traffic is to be provided, sidewalks must be reduced in width, thus reducing capacity for pedestrian movement; or public rights-of-way must be widened, eliminating existing buildings.

While tunnels and elevated structures allow the creation of "new" space for transportation, they may involve other costs: monetary and environmental.

THE PROBLEM OF VARIOUS NEEDS AND WANTS

A major problem for urban transportation is satisfying the variety of needs for mobility engendered by a very heterogeneous population. Urban populations are diverse in their cultures, types of work, life styles, and values. If such diversity is to be maintained, the transportation system must provide for the needs of all of the population. At present severe gaps in transportation systems exist in all cities, including San Francisco, in serving resident needs.

The automobile has made possible greater access for a large segment of the population to a larger variety of recreational opportunities, and educational and cultural experiences. On the other hand, where private transportation is relied on, those who prefer or need public transportation are deprived of means to obtain jobs, expand educational and recreational opportunities, and participate fully in urban life. Public transportation can only reasonably be provided if it is used by many; where this is not the case, the minority has relatively fewer opportunities.

Many persons cannot drive or own a car because of age, physical condition, or inadequate income. The elderly and youth, the poor and the handicapped have special needs. The elderly and infirm require access to medical facilities, children to school and recreation, workers to employment. The cost of transportation by whatever mode is critical for the poor.

Since the economic structure of the city is constantly changing, residents must be able to move to changing locations of employment. A transportation system which only provides adequate service to downtown will not satisfy the needs of those who must find work elsewhere, nor will it satisfy the needs of non-downtown businesses. As economic activities have become more widely dispersed, with industries finding new locations outside the center of the transportation network, and with transit service neglected by many residents in favor or the automobile, the problems of mobility have become more acute. For those faced with discrimination in housing and employment, the problem is worse if transportation to the opportunities that do exist is inadequate. In carrying out transportation planning and management, government has a responsibility to ensure that the transportation system continues to enhance opportunities for social and economic advancement by all groups.

THE PROBLEM OF MULTIPLE ORIGINS AND DESTINATIONS

A major concern of physical organization posed for urban transportation is the problem of adequately providing for movement among a multiplicity of scattered points at which people want to begin and end their trips. The growth of metropolitan areas over vast geographic areas creates the problem of providing linkages among many dispersed locations. No longer are all activities located along public transit routes or within walking distances of them. The automobile is more suited to linking this multiplicity of locations than any other mode, but it also contributes to this form of physical organization, making it more difficult to provide other means of travel.

Sources of employment, shopping, and entertainment are no longer limited to a few downtowns; residences are no longer limited to compact areas. A major problem, especially at the metropolitan scale, is providing for travel from one to another of these non-centered locations by alternative means. If everyone were able to have an automobile and automobiles had no other adverse impacts, that mode of travel would be suited to overcoming the problem. Since this is not the case, other means must be provided.

For most San Franciscans, this is not as severe a problem as in other parts of the metropolitan area and in other cities. The city is relatively compact and densely developed. As a result, there is sufficient potential demand for travel in many directions to support a good system of mass transit. The city has a good system now, but improvements will be needed.

Given the broad overview of transportation problems presented above, the next chapter will outline those factors special to the Bay Area and San Francisco, including geographical relationships, economic structure, and population characteristics which determine in part the solutions to transportation problems shared with other areas.

Planning for Transportation in San Francisco

Many general transportation problems are common to all cities; however, the more specific requirements for an adequate transportation system and the possibilities for providing it are determined by factors peculiar to each city. The nature of the physical, social and economic environment varies in each region and in each city, as does the role of any particular city in its region. Residents of some cities have different traditions and attitudes concerning transportation and other matters which must be respected. In order to place the general problems and relationships explored in the preceding chapter in local context, this chapter begins with a review of past transportation planning in San Francisco and of existing plans and policies, including the current Transportation Section of the Master Plan. This short history will indicate the kinds of problems which have been responded to in the past, the nature of the response, and how that response was shaped by local values and attitudes. The remainder of the chapter is a description of the physical, social and economic context, regional and local, present and future, which has shaped transportation planning in the past and will influence it in the future.

PAST PLANNING, RESIDENT ATTITUDES & CURRENT POLICY

Although comprehensive transportation planning by City government did not begin until after World War II, some substantial and foresighted efforts at single-purpose planning began long before. The San Francisco Municipal Railway (Muni) started operations in 1912 and began its development of an extensive network of bus, streetcar, cable, and trolley car routes throughout the city. About the same time the early and privately financed foundations of the present Alameda-Contra Costa (AC) transit district were laid, including a major ferryboat system across the Bay. Within a short time new highways were laid out to accommodate the increasing use of automobiles. Efforts were not coordinated at the regional or city level in any manner that could be called comprehensive, but rather needs and demands as they were seen were satisfied by separate agencies. The building of the Golden Gate and Bay Bridges in the 1930's established the transportation network as regional in scope, while bringing about the demise of the ferry system. Increased automobile use already had caused a decline in transit patronage, a foreboding of more

to come. Among the foresighted was City Engineer M. M. O'Shaughnessy who predicted, as early as 1931, that substantial traffic congestion in the city would occur after the opening of the two bridges; he argued for the development of a rapid transit system. The bond issue proposed for the streetcar subway was, however, defeated in 1937.[1]

World War II brought rapid growth. The number of industrial jobs in the inner five counties of the Bay Area more than doubled in two years. No expansion of transportation facilities was attempted then, and patronage of streetcar, train and ferryboat systems climbed far above any level before or since. After the war, planning for improved transportation facilities began at Federal, State and local levels. When the City's first Master Plan was adopted in 1945, the transportation elements consisted primarily of an assemblage of current plans of the various City departments. In recognition of the need for more extensive planning, a survey by four City departments (City Planning, Public Works, Policy and Muni) was undertaken in 1946 to determine solutions to transportation problems.

THE 1948 PROPOSED TRANSPORTATION PLAN

In 1948 consultants to the City Planning Commission, assisted by the four departments, presented a complete and comprehensive system of proposals for transportation improvements, based on consideration of social, economic, and physical conditions and problems in the city.[2] The proposed plan included recommendations for interurban rapid transit, freeways, local transit, traffic circulation and signalization, off-street parking, and terminals. It became the basis for future planning and subsequent revisions of the Master Plan. Three subway lines were recommended: Market-Twin Peaks to Parkmerced, Market-Mission to Daly City, and O'Farrell-Geary to the Pacific Ocean. In 1950 a bond issue was proposed

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[1]Information in this and the above paragraph is taken from the survey provided in BART: Dig We Must, by Patricia Alexander, a publication of the Federal Reserve Bank of San Francisco, January, 1970.

[2]DeLeuw Cather and Company, Ladislas Segoe and Associates, Transportation Plan for San Francisco, November, 1948.

for these and a fourth line through the Sunset Tunnel to Kezar Stadium but was not presented for a vote.[1]

During the early 1950's, the Federal and State governments decided to make available financing for freeway and highway developments. They did not provide similar financing for rapid transit. As a result, implementation of freeway and street proposals began, while choice of travel by rail, ferry and other forms of public transit was reduced.

THE TRAFFICWAYS PLAN AND ONE-WAY STREET PLAN OF 1951

In 1951, the City Planning Commission adopted the Trafficways Plan and the One-Way Street Plan, as components of the Transportation Section of the Master Plan, including designation of freeway routes, major thoroughfares, secondary thoroughfares, and one-way streets. The plans, as adopted, followed the recommendations of the prior studies and reports. A plan for transit was not adopted and does not currently exist in the Master Plan.

The 1951 Trafficways Plan included proposals for nine freeways. The network, when completed, would have provided four radial routes and two circumferential routes through the city. It was assumed that a rapid transit system would exist to handle much of the potential travel demand, especially to downtown.

Between 1951 and 1959, as the beginnings of the freeway system were implemented, a great amount of public opposition to freeways resulted. Community debate centered on the proposed routes and the design of the freeways. Finally in 1959, the Board of Supervisors passed a resolution (the "Freeway Revolt Resolution")[2] which established the policy that the City would not enter into future freeway agreements with the State Division of Highways for freeways passing through residential areas. Over the next several years this policy was modified by resolutions favoring two freeways on the condition that such freeways were tunneled. The State Division of Highways has opposed tunneling because of the high costs and at present no definite plans for new freeway agreements have

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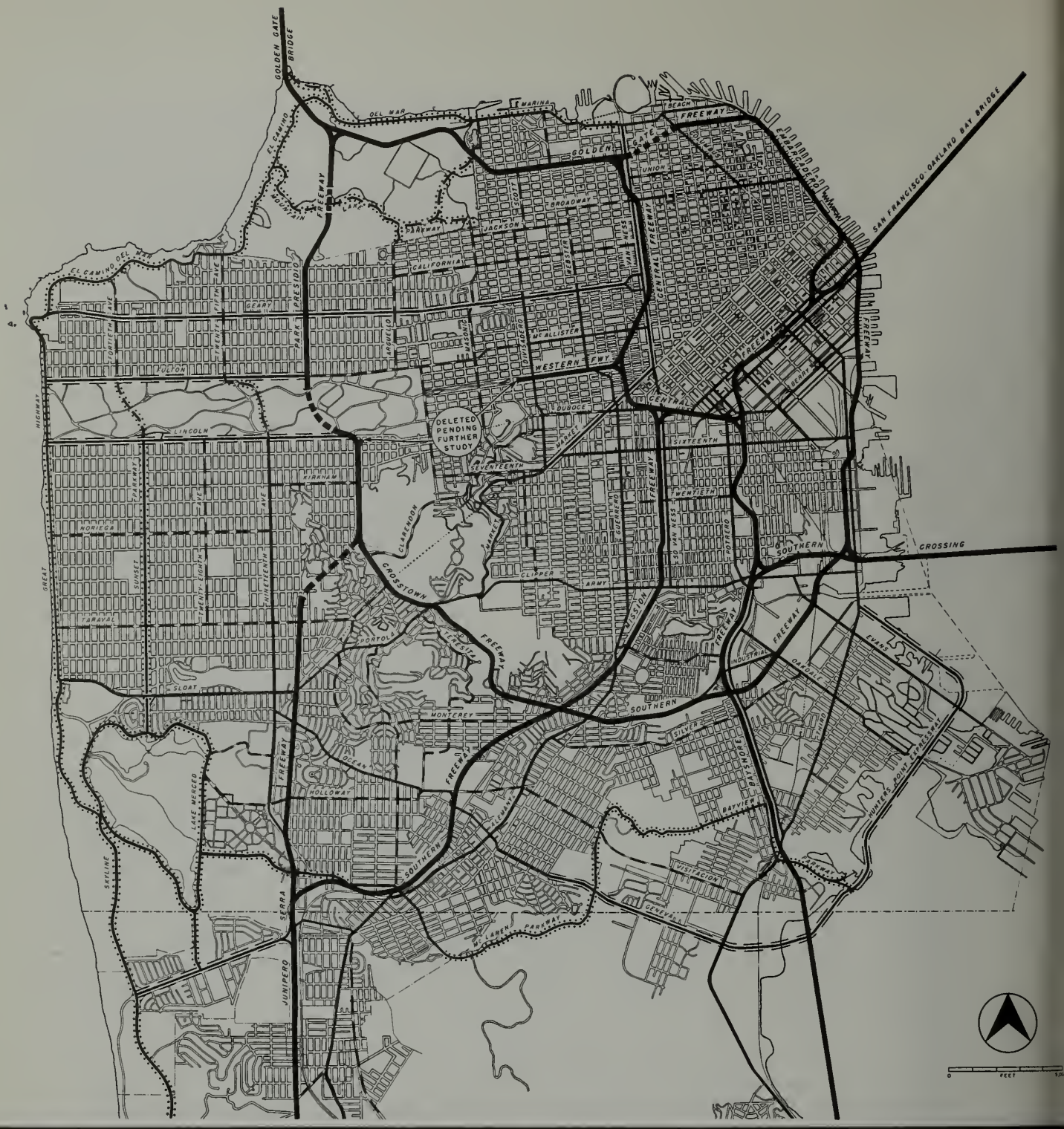
[1]Department of City Planning, Subways and Rapid Transit for San Francisco, 1950.

[2]Resolution 45-59.



TRANSPORTATION SECTION OF THE MASTER PLAN OF SAN FRANCISCO

TRAFFICWAYS PLAN

FREEWAY

MAJOR THOROUGHFARE

SECONDARY THOROUGHFARE

EXPRESSWAY TREATMENT

PARKWAY TREATMENT

THIS PLAN WAS ADOPTED BY RESOLUTION NUMBER 3948 ON JULY 17, 1951, AND AMENDED BY RESOLUTION NUMBER 4423 OF THE CITY PLANNING COMMISSION AT A REGULAR MEETING HELD ON MAY 19, 1955.

RECOMMENDED
Paul Oppermann
DIRECTOR OF PLANNING

APPROVED
Ernest E. Williams
PRESIDENT

CERTIFIED
Joseph L. Mignola, Jr.
SECRETARY

TRANSPORTATI

1

PLATE

SAN FRANCISCO DEPARTMENT OF CITY PLANNING

TRAFFICWAYS PRESENTLY FUNCTIONING AS DESIGNATED IN THE MASTER PLAN

FREEWAY

MAJOR THOROUGHFARE

SECONDARY THOROUGHFARE

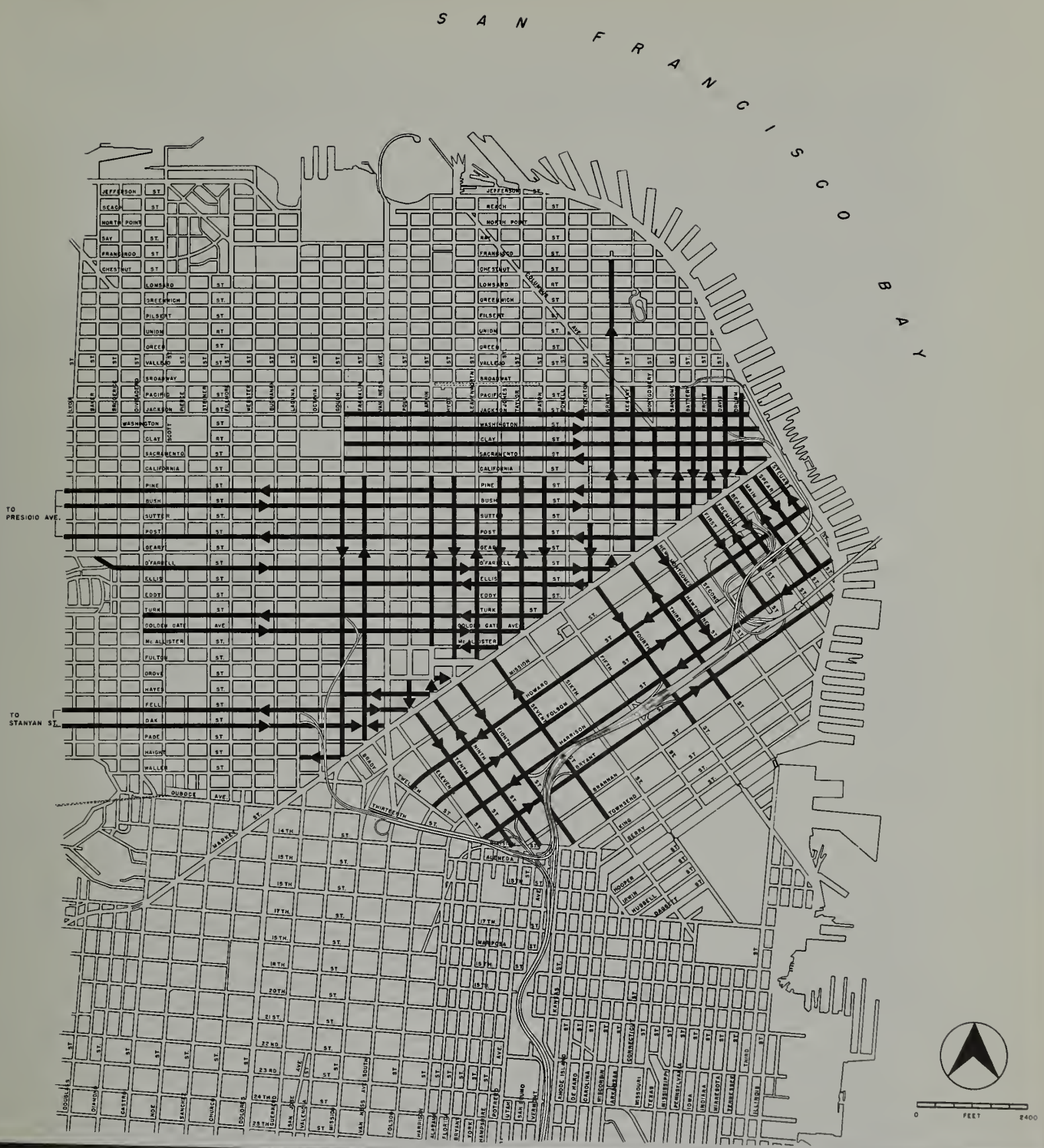
been reached. In addition, as a result of tremendous public opposition to the elevated structure of the Embarcadero Freeway, the Mayor and Board of Supervisors have resolved to have that structure removed.

The major thoroughfare system of the current Master Plan, as amended in 1955, is based on the philosophy of a total freeway network. Due to this fact it has been implemented only in part and there are major gaps in this designated major thoroughfares system. Many of the missing links are served by streets which presently function as major thoroughfares but are not officially so designated. One primary need now is to determine what the major thoroughfare system should be and what constraints should be placed upon it.

Debate and controversy during the fifties and early sixties centered on the proposed freeways found in the Trafficways Plan. More recently, since the Board of Supervisors' decision has made the freeway issue fairly moribund, community concern has focused on proposals regarding major thoroughfares. With additional freeways generally out of consideration and only slow progress toward a complete subway system, growing travel demand has led to pressure for increasing the capacity of the street system. This can be accomplished only through street widenings, sidewalk narrowings or conversion from two-way to one-way travel. Two major issues have arisen: the extent to which the street system will be increased to accommodate automobile traffic, and whether automobile traffic will be channeled into specific streets with higher capacities or be allowed to filter through the entire system. Several projects intended both to increase traffic capacity and to divert traffic to streets with increased capacities have met resistance from neighborhood residents who would be affected. Opposition to the realignment and widening of O'Shaughnessy Boulevard and sidewalk narrowing for Castro Street are examples of the attitude of residents toward projects they feel have an adverse impact on their neighborhoods.

The One-Way Street Plan was amended in 1954 and 1957 and has in large part been implemented. The Plan provides chiefly for traffic circulation within the downtown and on arterials connecting to it from the west. Controversy and debate continue on the proper pattern for traffic circulation within the downtown and adjacent areas, including residential areas which are affected by the heavy volumes of traffic carried on these streets. A new plan recently went into effect.

Expression of public opinion on transportation proposals and the development of BART require a new look at alternative



TRANSPORTATION SECTION OF THE MASTER PLAN OF SAN FRANCISCO

ONE-WAY STREET PLAN

ONE-WAY STREETS

THIS PLAN WAS ADOPTED BY RESOLUTION NUMBER 3885 ON JANUARY 18, 1951, AND AMENDED BY RESOLUTION NUMBER 4260 ON MARCH 25, 1954, AND BY RESOLUTION NUMBER 4691 OF THE CITY PLANNING COMMISSION AT A SPECIAL MEETING HELD ON APRIL 25, 1957.

RECOMMENDED
DIRECTOR OF PLANNING

APPROVED:
PRESIDENT

CERTIFIED:
SECRETARY

TRANSPORTATION PART

2

PLATE

means of accommodating increasing travel demand without impacts which residents of the city do not desire.

THE BEGINNINGS OF A RAPID TRANSIT SYSTEM: BART

During the same period that the use of freeways was being debated, plans were being developed for a regional rapid transit system. The Bay Area Rapid Transit Commission was established in 1951 to plan such a system, and completed its work five years later. In 1957 the Bay Area Rapid Transit District (BART district) was established to implement the plan with local consent. After withdrawal from the district of all but San Francisco, Contra Costa, and Alameda Counties, a reduced transit plan was approved by voters of the three counties in 1962, including the construction of the Market Street-Twin Peaks subway for local transit.

Since the commitment of the City to BART, study and policy-making have focused on the best means to coordinate the local Muni system with the BART lines, or possible extensions of BART to the San Francisco International Airport and the North Bay, and on other possible rapid transit lines in the city. Substantial improvements to the rolling stock of Muni are underway in order to improve service and provide for connections to the BART lines.

In summary, the history of transportation planning in San Francisco has been shaped in large part by attitudes of residents. As originally conceived by planners, a balanced transportation system was to have been created, relying heavily on rapid transit for downtown-oriented travel and freeways for vehicular traffic. The emphasis of Federal and State aid on freeways and street improvements encouraged development of these parts of the transportation system without corresponding improvements in public transportation. Despite this bias in financing, and because of strong feelings about the character of San Francisco's environment, residents opposed freeway construction. They also supported the development of a regional transit system. They have shown serious opposition to transportation proposals which might have a divisive effect on their neighborhoods or lower the quality of the environment. Future transportation planning will have to be responsive to the expressions of public sentiment which the past has evinced.

THE REGIONAL SETTING: PRESENT AND FUTURE

San Francisco is part of a growing metropolitan area. Growth continues to add stresses on the operations of the transportation system and to require changes in it. Changes in regional development patterns, the location of economic activities, and the characteristics of the regional population necessitate constant adaptation of the transportation system to new needs. The location of San Francisco in relation to the rest of the metropolitan area, its social, cultural, and economic role, problems of topography, and geological characteristics provide a setting for local transportation decisions.

PHYSICAL CHARACTERISTICS AND DEVELOPMENT PATTERNS

The Bay Area contains major geographic features which have influenced not only transportation networks but also development patterns over the years. San Francisco Bay separates the two major cities in the region, San Francisco and Oakland, and constitutes a large open space. From the point of view of transportation facilities, it is a barrier to easy access and a source of unusual travel modes. Ranges of hills and wooded preserves in the East, North and West Bays have channeled intense development in a linear pattern along the stream valleys and lower slopes. This pattern of development is conducive to the development of a series of linear transportation corridors, but the presence of the Bay prevents linkage between the corridors except at infrequent intervals. The North Bay is relatively isolated from the rest of the region.

In the southern part of the Bay Area fewer barriers are present to limit extensive urban development and expansion is proceeding rapidly in Southern Alameda, Santa Clara and San Mateo counties. Development is primarily at lower densities and is dispersed as a result of modern trends in land use and the absence of high capacity public transit systems encouraging concentration.

The existence of a linear pattern of growth, however, and of several significant urban centers, offers the possibility for the creation of a regional transportation network supporting a more compact pattern of development.

ECONOMIC AND DEMOGRAPHIC TRENDS

The Bay Area Transportation Study Commission predicts that the nine-county Bay Area will grow from a 1965 population of 4,336,400 to a range of 6,900,000 to 8,450,000 persons in

1990. Given a middle-range figure of 7,477,100, the Bay Area population will increase by 69.8 percent between 1965 and 1990.

Table 1

PROJECTED BAY AREA POPULATION GROWTH
1965 - 1990

County	Population		Increase 1965-1990	
	1965 (000's)	1990 (a) (000's)	Amount (000's)	Percent
San Francisco	754.8	826.6	71.8	9.5
Alameda	1,092.2	1,680.6	588.4	53.9
Contra Costa	530.4	1,080.6	549.6	103.6
Marin	181.8	408.7	226.9	124.8
Napa	61.8	139.8	78.0	126.2
San Mateo	559.5	872.5	313.0	59.9
Santa Clara	902.1	1,784.7	886.6	97.8
Solano	149.4	315.8	166.4	111.4
Sonoma	171.3	368.4	197.1	115.1
TOTAL	4,403.3	7,477.1	3,073.8	69.8

(a) Middle range forecast.

Source: Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

The growth of population is projected to be substantial in all counties except San Francisco and almost two-thirds of the three million population increase will occur in Alameda, Contra Costa and Santa Clara counties, chiefly in currently undeveloped areas.

As the Bay Area grows in population, it functions more and more as one economically interdependent unit. Basic employment (that which produces exports) has become a smaller part of total employment, since more goods and services are produced and consumed within the area. New transportation facilities have been provided and the outlying counties have become more economically integrated with the central cities.

Table 2

PROJECTED BAY AREA EMPLOYMENT GROWTH
1965 - 1990

County	Employment		Increase 1965-1990	
	1965 (000's)	1990 (a) (000's)	Amount (000's)	Percent
San Francisco	476.4	714.1	237.7	49.9
Alameda	396.7	724.5	327.8	82.6
Contra Costa	127.6	271.2	143.6	112.5
Marin	44.9	100.0	55.1	122.7
Napa	23.9	56.6	32.7	136.8
San Mateo	173.3	362.8	189.5	109.3
Santa Clara	314.8	665.6	350.8	111.4
Solano	49.4	109.2	59.8	121.1
Sonoma	57.0	110.5	53.5	93.9
TOTAL	1,664.0	3,114.5	1,450.5	87.2

(a) Middle range forecast.

Source: Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

One indication of the economic interrelationship of the nine counties is the increase since 1960 in the number of employees who work in counties other than those in which they reside. This increase is found in each of the nine counties. (Table 3). The trend is especially significant for San Francisco because almost half of all Bay Area residents who work outside their own counties work in San Francisco.[1] In addition, the percentage of San Franciscans working outside the city has been increasing rapidly.

[1]Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

Table 3

PERCENTAGE OF WORKERS IN BAY AREA
EMPLOYED OUTSIDE COUNTY OF RESIDENCE

County of Residence	1960(a)	1965(b)
Alameda	13	19
Contra Costa	35	41
Marin	39	46
Napa	NA	31
San Francisco	7	13
San Mateo	44	46
Santa Clara	NA	14
Solano	11	20
Sonoma	NA	14
TOTAL		24

NA = not available.

Sources: (a) U.S. Bureau of the Census, Census of Population, 1960.
(b) Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

San Francisco was once the manufacturing center of the Bay Area, but today the most industrialized districts are the continuous belts along the east and west sides of the Bay. The primary base of San Francisco's employment is now services and trade -- finance, insurance, real estate, corporate office activities, and government. Jobs are of the "white collar" type by and large and are increasingly filled by nonresidents.

The overall growth in regional population projected to occur and changes in the structure of the regional economy will necessitate substantial modifications in transportation facilities to service new needs, either in accordance with the projected trends or in an attempt to modify the future according to the goals of the region.[1] If the bulk of growth

[1]Association of Bay Area Governments, Regional Plan, 1970.

continues in the outlying counties, there will be increased demand for a transportation network which links those portions of the region with the more highly developed sectors. A factor of some importance will be the growing pressure for means of getting to recreational and cultural facilities demanded by an increasingly affluent population.

At the same time that economic growth and population growth will expand demand for facilities for connecting work, shopping, homes and recreation, new problems will arise and old ones will be aggravated. If present patterns of development continue in response to available transportation facilities, open space and recreational opportunities will be more distant and means of getting to them harder for everyone. In addition, many new residents will choose residential locations outside of the central cities because of their preference among types of housing and residential environments and the absence of adequate space in the older cities. However, many of them will have jobs in the central cities and increasing travel demands will result.

Decentralization of economic activity will mean dispersal of certain job opportunities. To the extent that lower income persons and members of minority groups are unable to afford or find housing in areas near new employment centers, their opportunities will be restricted. This is likely to be a particularly serious problem for residents of central cities. Even if housing can be found in outlying areas, decentralization of activities without adequate public transportation may make it extremely difficult for residents who cannot afford two cars to live in those parts of the region. They may therefore be forced to choose between inability to subsist decently with a better job in the suburban areas and limited but accessible job opportunities in the central cities.

Increasingly there will be significant social and cultural differences between the people who work in the central cities and those who live there. Residential locations in these cities will not be attractive to many persons employed in them. The differences between the commuter and resident populations may cause increasing conflicts. If the predicted shifts in types of economic activity take place, as well as substantial white-collar job growth in the central cities, these cities will either have to grow considerably in their residential population (requiring substantial redevelopment), or provide for increased commuting, or modify growth trends to avoid either of the other options.

There is very little reason to doubt that San Francisco will continue as the cultural and economic center of the region. It will be the favored location of the most

specialized activities. However, other urban centers will also begin to serve as major regional centers offering similar activities. Whether they will attain a position comparable to that of San Francisco may be determined in large part by local and regional transportation decisions affecting possibilities for access within the region among the major centers.

REGIONAL TRANSPORTATION AGENCIES AND JURISDICTIONS

Planning a regional or even local transportation system is not a unilateral operation. There are, at times, up to ten agencies (Federal, State, regional and local) which may become involved in a particular project. There are about seventeen agencies that build highways, build and operate bridges, and build and operate streetcar, commuter rail, rapid transit, bus and ferry systems in the Bay Area. In addition, many ad hoc entities are on occasion established to perform special studies or to administer particular programs. In the following pages the various transportation agencies and study groups are noted.

Federal

U. S. Interstate Highway System. In California, routes of the Interstate Highway System function essentially as part of the extensive California State highway system, with the distinction that Federal funds account for ninety percent of their construction and right-of-way costs, and that standards of the interstate system are used in design.

Federal Aid System of Highways. This system was originally designed to provide a basic framework of inter-city trunk routes. The Federal government pays 50 percent of the project costs. This system is still being maintained; however, most new additions to the highway system which are Federally aided are of the interstate type, with higher standards and greater Federal financial participation.

State

California Division of Highways. Both the Division of Highways and the Division of Bay Toll Crossings are part of the State Department of Public Works. A significant part of a freeway network has been completed throughout the state, including the San Francisco metropolitan area, as a result of an extensive statewide freeway plan. Several freeway routes have been rejected in San Francisco, and some opposition to additional routes in adjoining counties has been politically significant. However, it is likely that most of

the freeways proposed for areas where land is changing to suburban residential use will be built.

California Division of Bay Toll Crossings. Existing and proposed bridges crossing San Francisco Bay can be considered part of the state and interstate system, in terms of a grade-separated vehicular network. With the exception of the Golden Gate Bridge, all Bay bridges have been constructed for and operated by the Division of Bay Toll Crossings, under State legislation creating the California Toll Bridge Authority.

Regional or Metropolitan

Golden Gate Bridge, Highway and Transportation District. This district is a regional agency comprising six California counties (from San Francisco north to Del Norte at the Oregon border) and was created by the State Legislature for the purpose of constructing, financing and operating the Golden Gate Bridge. It was originally anticipated that the district would be dissolved when bridge revenue paid for all costs. If no major new obligations are incurred, the district could soon be debt-free.

Recent State legislation permits the district to participate financially in bus and ferry commuter service between the North Bay and San Francisco. This legislation also directs the district to develop a plan within two years for a comprehensive transportation system in the North Bay Corridor. During this same period, the district is prohibited from proceeding with any development plans for a second deck. Following completion of this study in 1971, the State Legislature will decide the fate of the district. The district has already established ferry service and is about to commence an intercounty bus system which will replace existing Greyhound service.

Association of Bay Area Governments (ABAG). ABAG is a regional nongovernmental agency, functioning by contractual agreement among member cities and counties. Eight counties and 81 cities are members, representing over 99 percent of the nine-county Bay Area population. Financed in part by a Federal Urban Planning Assistance Grant, ABAG can function as a regional agency through which Federal grants for local studies can be approved.

The ABAG Regional Plan, officially adopted this year, is the first comprehensive regional plan for the Bay Area, including consideration of issues and problems in the areas of transportation, as well as open space, refuse disposal, and the Bay and its shoreline.

San Francisco Bay Conservation and Development Commission (BCDC). BCDC is a State commission dealing with a regional problem: conservation of the waters of the Bay and development of the Bay shores. It has the authority to limit future filling of the Bay, and as such could prevent future freeways and airport expansion presently considered by city, county or State agencies. Various BCDC planning studies consider transportation, ports, and airports on the Bay. BCDC has permanent status and its authority includes control of the shoreline.

Bay Area Transportation Study Commission (BATSC). In 1969, BATSC presented its master regional transportation plan to the State Legislature. This plan included recommended means of implementing the plan. The Commission provided a transition from its work to permanent agencies to achieve a continuing transportation planning process. With the submission of its report, BATSC ceased its existence. The Regional Transportation Planning Committee (RTPC) was established to continue planning on an interim basis. A new permanent, regional transportation agency, the Metropolitan Transportation Commission (MTC) was established by the last legislature. It will begin functioning soon and is charged with coordination of mass transit and highway planning.

Intercounty or Intercity

Bay Area Rapid Transit District (BART District). The 75-mile BART rail system presently under construction will serve population and employment areas in San Francisco, Alameda, and Contra Costa counties. As an independent public agency, the District has the authority to levy taxes up to five cents per $100 assessed valuation on all taxable property within the District for administrative purposes, plus additional taxing power in order to redeem the original general obligation bonds of 1962.

Alameda-Contra Costa Transit District (AC). The boundaries of the AC Transit District include parts of these two East Bay counties, with eleven cities and several unincorporated areas west of the Berkeley-Oakland Hills. The District also has the power to levy a tax on property within its jurisdiction. In addition to its local transit network, AC Transit runs a number of buses over the San Francisco-Oakland Bay Bridge to and from the Transbay Terminal at Mission and First Streets, which is leased from the Division of Bay Toll Crossings.

Northern California Transit Demonstration Project (NCTDP). This project, financed in part by the Department of Housing and Urban Development and completed in 1967, is

the one attempt so far to coordinate the BART District, AC Transit District, and San Francisco Municipal Railway systems. The final report recommends a specific coordinated system for the three transit systems, staging of route changes, and future requirements for rolling stock, fare structures and collection. At this time, the recommendations have not been adopted by the three participating agencies.

Southern Pacific Railroad. The Southern Pacific Railroad operates a commuter rail line between San Francisco and San Jose, which brings more than half of all transit passengers traveling from San Mateo and Santa Clara counties to San Francisco. Though Southern Pacific does not promote additional patronage, since this would restrict freight movement using the same tracks, it has kept a constant level of service and in 1968 bought some new rolling stock.

Western Greyhound Lines. Western Greyhound has three distinct bus commuter operations using San Francisco terminals. Two operations use the Greyhound Seventh Street terminal: one serving both the east and west Peninsula corridors and the other serving Marin County (Marin County routes also terminate near the Ferry Building). The third Greyhound operation connects Contra Costa County to San Francisco using the Bay Bridge and the Mission and First Streets terminal. Western Greyhound has expressed the desire to relinquish all commuter operations as soon as possible, and only serve long-haul, intercity travel.

Marin County Transit District. Because the original BART line over the Golden Gate Bridge was rejected by the Golden Gate Bridge, Highway and Transportation District and the present Greyhound bus system is not satisfactory, the Marin Transit District was established to create an operating county transit agency. The district developed an "Optimum Bus Plan", which called for a comprehensive local and intercounty bus system. The Golden Gate Bridge, Highway and Transportation District has assumed responsibility for implementation of that plan.

San Francisco-Marin Water Transportation Study Committee. A study to determine the feasibility of a ferry system between San Francisco and Marin counties has recently been completed. It was prepared independently of the Marin County Transit District's bus study by consultants to the two counties. The study indicated that a ferry system was both a feasible and desirable means of increasing capacity for commuter travel. Its recommendations are the basis for the establishment of ferry service by the Golden Gate Bridge, Highway and Transportation District.

West Bay Rapid Transit Authority (WBRTA). In the spring of 1969 the West Bay Rapid Transit Authority completed its transit Master Plan for San Mateo County. This plan, defeated by the county voters in June, 1969, called for a local and feeder bus system with the possibility of eventual inclusion of rapid transit. The defeat of the WBRTA Master Plan should not be considered a rejection of rapid transit since the voters could only choose between new buses and continuation of the existing facilities and services. Since the vote, WBRTA has been dissolved; however, detailed work on a rapid transit system survives. This provides a basis for future proposals for improving public transit to San Francisco International Airport and the Peninsula.

Santa Clara Transportation Planning Study. A study was financed in part by the Department of Housing and Urban Development to attempt to initiate and maintain a county land use-transportation planning program. The Transportation Policy Committee suggested a unified system of public transit for the county and a special transit district to operate the system. In response to this recommendation, the State Legislature authorized establishment of the district. This district proposed a countywide bus system with an early right-of-way purchase program for a rapid transit connection with BART. The plan was defeated by the electorate in September, 1969, and the district was dissolved. At this time, the future transit program for Santa Clara County is unknown.

The number of agencies involved in transportation planning and operation of facilities in the metropolitan area makes coordination and comprehensive planning difficult. Attempts to simplify this complex web of transportation jurisdictions have been made in proposals being considered by the State Legislature. The essential problem to which a solution needs to be found is to combine the advantages of overall regional transportation planning with the necessity for local control over transportation matters seriously affecting each locality, thus ensuring conformance to community goals and contribution to the solution of special local problems.

CONFLICTING GOALS AND PLANS AMONG LOCALITIES

Transportation planning in the region must take place within the context of conflicting sets of goals held by various communities in the Bay Area. Just as San Franciscans desire to control the destiny of their city, other residents in the Bay Area have their own goals. Where the goals or conceptions of how to achieve them are inconsistent, it may

not be possible to develop a comprehensive regional transportation system without the establishment of a regional government to reconcile conflicts, and even this approach is not a solution to varying needs and wants within the region.

Conflicts will continue to occur as to the expected effects of changes in facilities, preferences in modes, or designs of particular facilities. These issues have already arisen in many cases. Berkeley opposed BART's plan to run its line on elevated structures for environmental reasons and finally agreed to pay the cost of undergrounding it. San Francisco itself agreed to join the system only on the condition that the BART District pay for a new Muni line along Market Street and under Twin Peaks. Marin County may oppose extension of BART by the Golden Gate crossing because it does not want to encourage more intense development in southern Marin. Similar conflicts and varied opinions will be found as to the effects, advantages and disadvantages of different alternatives, due to limited understanding and multiple goals. The development of general goals and policies for the region by the Association of Bay Area Governments may further progress toward agreement on the basic requirements of a regional system.

San Francisco, in its position as the major city in the metropolitan area, must take a leading role in formulating transportation policy. At the same time it must ensure that its share of needs is satisfied by proposals to expand the metropolitan system.

LOCAL FACTORS FOR TRANSPORTATION PLANNING

While regional factors and trends determine the broad outlines of the transportation system requirements which must be partly met in San Francisco, characteristics of San Francisco itself -- physical, economic, social -- are the factors relevant to transportation choices most directly affecting city residents and most directly related to the attainment of community objectives. It is these factors that help to determine the choices for San Francisco among alternative transportation systems.

PHYSICAL CHARACTER OF THE CITY

The strongest defining features of San Francisco are the hills and the water. The high central hills -- Twin Peaks, Mt. Sutro, Mt. Davidson and Diamond Heights -- tend to divide the city into two parts. Historically, the rough topography

constituted a barrier, channeling early development into a wide arc running from the Golden Gate to the South Bayshore area. Industry and commerce located on the flatlands adjacent to the Bay and residential development located nearby. Major transportation routes follow the valleys between the hills. Because of the importance of the seaport in the early economic growth of the city, the most dense development is found in the northeastern section of the city, itself characterized by hilly terrain. Other sections of the city are dominated by smaller elements of topography. With industry and commerce located primarily in the lowlands, the hills nearby provide ideal sites for residential areas, buffered by the height from noise and traffic and blessed with magnificent views.

Early street development determined the pattern of man-made development in the city. Following the standards of the day, the Spaniards and later planners laid out the city's streets in grid fashion. However, because of changes in terrain, San Francisco has several street grids. Market Street, a spine bisecting the city on a northeast-southwest axis, separates the major grids. One grid continues almost uninterrupted from the area north of Market Street to the Ocean. A second grid operates in the area south of Market and in line with it to Potrero Hill, where another grid forms the hill's street pattern continuing into the Mission district. A mixture of street patterns is found in the south central and southeastern parts of the city where topography separates these areas from the rest of the city. The Sunset is characterized by the most uniform grid system in the city, as a result of more recent development.

The existence of significant topographic changes and major open spaces, such as Golden Gate Park, creates separate identities for many parts of the city. Although densely developed, the city is characterized by development of small scale, low height and continuity in architectural character within its separate parts. High and massive buildings occur generally only in the downtown financial district, as new additions to the city's physical fabric.

LAND USE PATTERNS AND BUILDING TYPES

The city is predominantly residential in land use, with large amounts of housing even within the commercial and industrial districts. Due to the small scale of development, there are few districts without some mixture of land uses and subcenters of nonresidential use are fairly compact. This pattern of land use has very different implications for transportation planning than would be the case if there were a

greater dispersal of major trip-generating uses. Neighborhood-supporting uses are frequently within walking distance and downtown contains most employment and specialized activities.

Almost all industrial development in the city is located on the flat areas in the eastern and southeastern parts of the city next to the Bay. Concentrations of commercial uses outside of downtown are found along Geary Boulevard in the Western Addition and Inner Richmond, along Market and Mission Streets, at the Stonestown Shopping Center and along other major streets and transit routes.

Residential densities are highest in the northeastern part of the city, with over 200 persons per acre in some parts. Lowest densities occur in the area southwest of Twin Peaks. Residential densities throughout the city are high relative to other parts of the region, ranging from 75 to 200 persons per acre.

Only one-third of the housing stock consists of single-family dwellings, and very few of these are detached.[1] A little over a third of all housing units are in apartment buildings having ten or more units. Most of the apartment units are relatively small, and even most single-family dwellings have less than seven rooms. Approximately two-thirds of all apartment buildings do not accept families with children. As a result, much of the housing stock is not preferred by families, especially those of middle and high incomes who can find larger and more modern housing in the suburbs. In part, the character of the city's housing stock, in combination with substantial growth in employment, is therefore encouraging an increase in commuting to the city for work.

No major changes in land use or building types are expected in the city, since residents are not favorable to massive redevelopment projects and current City policy is oriented to conservation and improvement of existing residential areas.[2] Redevelopment projects underway will provide new housing in the Western Addition and Diamond Heights.

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[1]San Francisco Department of City Planning, Survey of Housing (Housing Report No. 3), December, 1969. All information in this paragraph comes from that report.

[2]San Francisco Department of City Planning, Improvement Plan for Residence, June, 1970.

Significant changes in land use are resulting from commercial and industrial redevelopment projects in the Golden Gateway, Yerba Buena, and India Basin areas.

POPULATION AND ECONOMIC TRENDS

Preliminary 1970 census estimates indicate that the city has a population of 704,000, a decline of 36,000 since 1960. Population is expected to remain stable over the next decade and increase slightly between 1980 and 1990.[1] Although the total population of the city may not change, the composition will. A greater number of residents will be of lower incomes than in other parts of the region, although general economic growth will mean that the number of poor in the city will not be as great as in the past. Increasing numbers will be in the younger and older age groups, with the most substantial increases occurring in the youth and young adult population. Fewer families and more single households are expected. Growing diversity in the composition of the population according to age, income and living characteristics will increase the varieties of transportation demand.

The economic structure of the city is also changing. The trend has been away from manufacturing to services as the economic base. Government, business services and commercial enterprises are continually growing, especially in the downtown area. Although substantial amounts of industry remain in the city they are increasingly concentrated in the southeastern and south central parts of the city, where land is cheaper and access for freight handling better. The downtown area remains the economic nerve center of the city and region.

Employment in San Francisco is estimated to have grown at an average annual rate of 6,600 new jobs over the past ten years.[2] This growth in employment has increased commuting to the city by nonresidents. Between 1960 and 1965 the employed, resident labor force declined and commuting out increased. As a result, commuting to the city increased by over 50 percent in five years. It is assumed that growth in commuting has continued to date.

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[1]San Francisco Department of City Planning, Population Projections for San Francisco, 1960 to 1990, April, 1968.

[2]State of California Department of Human Resources Development, Area Manpower Review, March, 1970.

Table 4

EMPLOYMENT OF SAN FRANCISCO RESIDENTS IN AND OUT OF THE CITY AND NONRESIDENT EMPLOYMENT IN THE CITY 1960 - 1965

	1960(a)	Net Change	1965(b)
Working Population of San Francisco	336,600	-3,400	333,200
Commuting Out	23,200	+19,250	42,450
Percent	7%	+6%	13%
Working in the City	313,400	-54,750	290,750
Percent	93%	-6%	87%
Nonresidents Commuting In	122,000	+63,650	185,650
Total Employees in City	435,400	+41,000	476,400
Percent residents	72%	-11%	61%
Percent nonresidents	28%	+11%	39%

Sources: (a) U.S. Bureau of the Census, Census of Population, 1960;
(b) Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969; "Memorandum", July 1, 1968.

Employment in San Francisco is projected to reach 714,000 by 1990, an increase of 50 percent over 1965 employment.[1] While the city's projected percentage growth in employment is the lowest in the region, in absolute numbers it is the third largest.

The net commute rate is projected to increase by more than 90 percent from 1965 to 1990, or by 176,000 persons.[2] If trends continue, the number of out-of-county workers in San Francisco will command a much larger percent of the jobs available in the city and increases in reverse commuting by residents will continue as the job market shifts. It should be pointed out, however, that whether these trends continue is to some extent a function of transportation decisions to be made by the City and the region.

An increasing problem for the future is the discrepancy between the kinds of jobs available in the city and the nature of the population expected to live here. The decline in manufacturing and "blue-collar" jobs is reducing the number of potential job opportunities for unskilled and semi-skilled residents. Changes in the job structure and economic growth in the city do not, at present, tend to favor this group. Opportunities outside the city are limited, in part because of inadequate access and lack of housing. Decisions on

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[1]Table 2. The Bay Area Simulation Study (BASS) predicts a higher 1990 employment figure for San Francisco of 828,000. Only BASS has prepared employment figures into the next century and for San Francisco these are:

Year	S.F. Employment
2000	969,000
2010	1,105,000
2020	1,240,000

According to this BASS forecast, the number of jobs in San Francisco by the year 2000 will exceed the number of city residents. San Francisco employment under the category of "services" (eating, drinking, lodging, finance, insurance, and real estate; personal, medical, health, education, and miscellaneous services) is expected to increase from 222,826 jobs in 1965 to 456,562 jobs in 2000.

[2]Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

transportation will affect whether these trends become fact or whether other solutions to the problems of these residents are found.

At the same time, job opportunities attractive to non-residents are increasing. As has been explained, the nature of the San Francisco housing stock makes residential location here unattractive to many who work here. If employment continues to expand, commuting will increase drastically. Decisions on transportation will determine in part the extent to which employment and commuting to the city will grow.

For most residents increasing income and leisure time are leading to new demands on the transportation system. Recreation, pleasure travel, socializing, shopping and entertainment are increasing. As a result many more trips taken by people in the future will be for nonwork purposes. Because recreational and other nonwork activities are less concentrated than employment, demands for access will require improvements in the mesh of transportation networks to offer travel in many directions to many different activities.

RESPONSIBILITIES FOR TRANSPORTATION PLANNING IN CITY GOVERNMENT

Four different City agencies and departments have primary responsibility for transportation planning in San Francisco: the Departments of City Planning and Public Works, the Parking Authority, and the Municipal Railway. Other agencies and departments also have limited responsibilities for surface transportation planning and implementation: the Police Department, the Port Commission, the Redevelopment Agency, and the Airports Commission. The latter administers San Francisco International Airport and regulates some related ground transportation.

San Francisco Municipal Railway (Muni). The Municipal Railway is the sole public transit agency for San Francisco, operating a closely knit network of 61 bus and streetcar lines. The Muni system has by far the highest patronage of all transit systems in the Bay Area, and this is expected to be the case even after the BART system is in operation.

The Muni, which is administered by the San Francisco Public Utilities Commission, has had difficulty in replacing its equipment. New rolling stock, including streetcars and mini-buses, are now being purchased by means of a nonprofit corporation.

San Francisco International Airport. The San Francisco International Airport is administered by the San Francisco

Airports Commission. A 1967 traffic study for the airport notes a sizable future growth in air passengers, air cargo, and related local employment. The first phase of a long-range development plan was financed by general obligation bonds in 1967, and includes the expansion of the passenger terminal complex and the related automobile structure, new air cargo facilities, and the extension of one runway. This growth will affect plans and programs of the State Highway system and BART or any similar transit authority in dealing with additional vehicular and transit capacity.

San Francisco Department of Public Works. The city traffic engineering and highway design sections are part of the Department of Public Works and are supervised by the City Engineer. This department is responsible for the planning and design of street improvements and also proposes changes in road width and the establishment of one-way streets, meter spaces, towaway lanes, and channelization.

The Department of Public Works is presently completing a series of transportation studies entitled the Downtown Parking and Traffic Survey (DPATS).

San Francisco Parking Authority. The Parking Authority administers all downtown and neighborhood parking garages and lots subsidized in part by City funds. As an action agency, the Authority suggests the location of new garages and lots and extensions to existing ones.

San Francisco Department of City Planning. The Department of City Planning is responsible for development of a comprehensive transportation plan as part of the Comprehensive Plan for San Francisco (Master Plan). It also is responsible for designation of types of streets and other vehicular ways, and coordination of capital improvements proposed by other departments.

Technical Advisory Committee to the Transit Task Force. There is at present an interdepartmental advisory committee to the Transit Task Force, which is responsible within City government for coordinating reconstruction of Market Street with BART construction, including the Muni Market Street subway.

Division of responsibility for transportation planning in San Francisco has much the same effect that it has in the region as a whole. Because each department can plan for only part of the system, coordination is at times difficult to achieve.

GOAL CONFLICTS AND COMMUNITY INTERESTS

A critical factor which cannot be ignored in planning for transportation or any other function is the conflicts of interests and goals which are held by varying members of the overall community. Transportation decisions, like other policy decisions, benefit some persons more than others. Goals and interests are based on individuals' values, prospects, ties to institutions and businesses, all of which are affected by decisions relating to transportation.

While downtown businesses are concerned to improve access from all parts of the city and region to downtown in order to enhance their economic prospects, merchants in outlying areas are primarily concerned with the effect of the transportation system on their ability to compete, with each other and with downtown. Residents have varying preferences among types of travel and are concerned with the effect of route locations on their neighborhoods, access to entertainment, recreation, shopping and housing alternatives. All are concerned in different ways with employment opportunities and access to them.

Conflicts in goals occur among individuals as individuals, among neighborhoods within the city, and between neighborhoods and the city as a whole. A recent study[1] indicated the actual and potential conflicts between neighborhood and citywide interests. A survey of attitudes of residents brought out traffic as one of the clearest cases of a conflict among goals. The city requires an efficient transportation system. Neighborhoods are concerned about through traffic, the effect of new transit facilities, and freeways.

Each individual has varying concerns depending on the role he is playing at any particular moment. As driver of an automobile, he may be frustrated by pedestrians and frequent traffic lights; as pedestrian, aggravated by the constant movement of cars; as resident, with the noise and hazards of frequent traffic; or as businessman, with the convenience of access for his customers. The central problem for all is to understand how transportation will help achieve the many objectives held.

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[1]Department of City Planning, Social Reconnaissance Survey, Urban Design Study Preliminary Report No. 6, September, 1970.

In the end not all conflicts can be resolved, not merely for technical and organizational reasons, but because individuals attach different values to aspects of their life. Some may be more concerned with beauty and quiet, others with speed or cost, others with privacy, comfort or effortlessness. The trades that will be made by individuals in their private transportation decisions and by the community as a whole will, nevertheless, depend on the alternatives proposed.

This chapter has been concerned with a description of regional and local factors, operating both as sources of opportunity and as constraints, which influence the kind of transportation system the city requires in the future. Attitudes of residents toward transportation alternatives and their relation to the city's physical, social and economic environment are an important factor. Topography, land use patterns, the economic structure of the region, social problems and conflicts among localities and among individuals in their values and interests are all important matters which must be considered in transportation planning. Solutions to transportation problems must be conceived within the context of these factors if overall community goals are to be furthered.

The most important factors were seen to be 1) opposition of residents to transportation projects which have adverse impacts on their neighborhoods, 2) topographic constraints on route choice and the capacity of facilities for intercity and intracity travel, 3) increasing economic interdependence among Bay Area localities, 4) the growing mismatch between population and economic opportunities in San Francisco, 5) the role of the city as the economic and cultural center of the Bay Area, and 6) the division of responsibility for transportation planning at both regional and local levels.

The Existing Transportation System

Because San Francisco and adjacent counties are already intensively developed, few opportunities exist for drastic changes in transportation networks or facilities. The existing transportation system must, therefore, be seen as a basis upon which to build additional facilities and provide new services for present and future needs. The system is comprised of metropolitan roadways, intercounty rail transit, buses and ferries, local streets, and local transit.

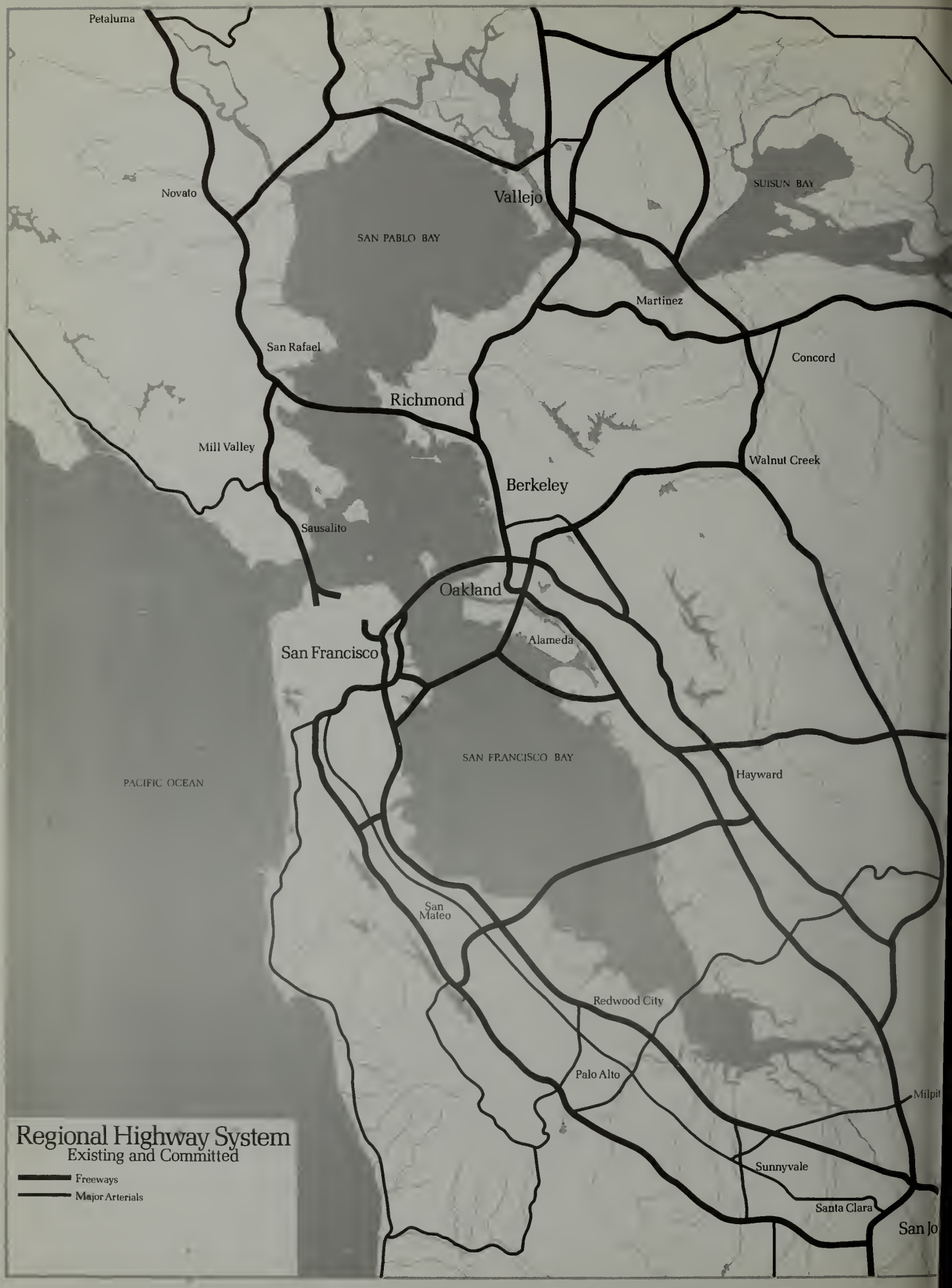
THE METROPOLITAN NETWORK

San Francisco is the destination of many trips made by residents throughout the metropolitan area. As a result, the nature of the metropolitan transportation system is a crucial factor in planning for transportation in San Francisco. Since San Francisco is located on the end of a peninsula, surrounded by water on three sides, all travel between the city and other parts of the region can be described in terms of three corridors (the East Bay, the North Bay, and the Peninsula) irrespective of the mode of transportation offered.

VEHICULAR SYSTEM

The metropolitan vehicular system is comprised of freeway and major arterial networks. This system links the metropolitan area with San Francisco via the Golden Gate Bridge from the North Bay, the San Francisco-Oakland Bay Bridge from the East Bay and a series of arterials and freeways from the Peninsula separated by the San Bruno Mountains into two corridors. Limited accessibility from the north and east both limits the potential for expanded highway access to San Francisco and compounds the demand of the metropolitan area on the existing bridges.

The peninsular location of San Francisco, while presenting difficult vehicular access problems, also has a positive aspect. Regional traffic and metropolitan traffic between non-San Francisco points tend to bypass the city wherever possible. This factor to a large extent negates the need for major through routes, leaving the primary concern of the highway system in San Francisco focused upon metropolitan routes radiating from the city.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North Bay

The North Bay corridor, comprised primarily of Marin and Sonoma counties, has only one direct highway link to San Francisco. This is U.S. Route 101 via the Golden Gate Bridge which enters the city at the Presidio. Traffic from the North Bay reaches downtown through the city's Marina and Richmond districts. There are no freeway or other limited access routes from the Presidio boundaries to downtown and this traffic is dispersed on major thoroughfares. These thoroughfares pass through largely residential areas and are used not only for North Bay traffic but for San Francisco interdistrict travel as well.

North of the Golden Gate Bridge, topography has restricted major north-south movement to the use of Highway 101 and this route is severely congested in peak periods. A basic controlling element in this corridor is the capacity of the Golden Gate Bridge. Any major vehicular capacity expansion in this corridor would require additional Bay crossing capacity which in turn would result in the need for more vehicular capacity on both sides of the Bridge.

East Bay

The East Bay corridor consists basically of Alameda and Contra Costa counties and includes the major cities of Oakland, Berkeley, Richmond, Alameda and Concord. The area is laced with a system of freeways and major arterials with the main vehicular connection to San Francisco being the San Francisco-Oakland Bay Bridge. An additional major bridge, the India Basin Bridge, is planned. This would link the cities of Alameda and Oakland with San Francisco's Bayshore district and San Mateo County. Other existing Bay crossings include the San Mateo-Hayward Bridge, which provides a connection from southern Alameda County points to San Mateo County and thence to San Francisco. Traffic between the East Bay and the North Bay generally bypasses San Francisco by using the Richmond-San Rafael Bridge.

Traffic destined for San Francisco over the Bay Bridge uses the Eastshore, Nimitz, MacArthur, and the new Grove-Shafter Freeways as well as major arterials to approach the Bridge. This traffic enters San Francisco in the South of Market area. The Bridge connects directly with the James Lick Freeway and will be connected to the Southern Freeway via the Embarcadero Extension for outlying San Francisco and westside Peninsula points.

Peninsula

The counties of San Mateo and Santa Clara comprise the corridor directly south of San Francisco. In contrast to the North and East Bay, this corridor has numerous vehicular connections to San Francisco and the potential for additional connecting routes.

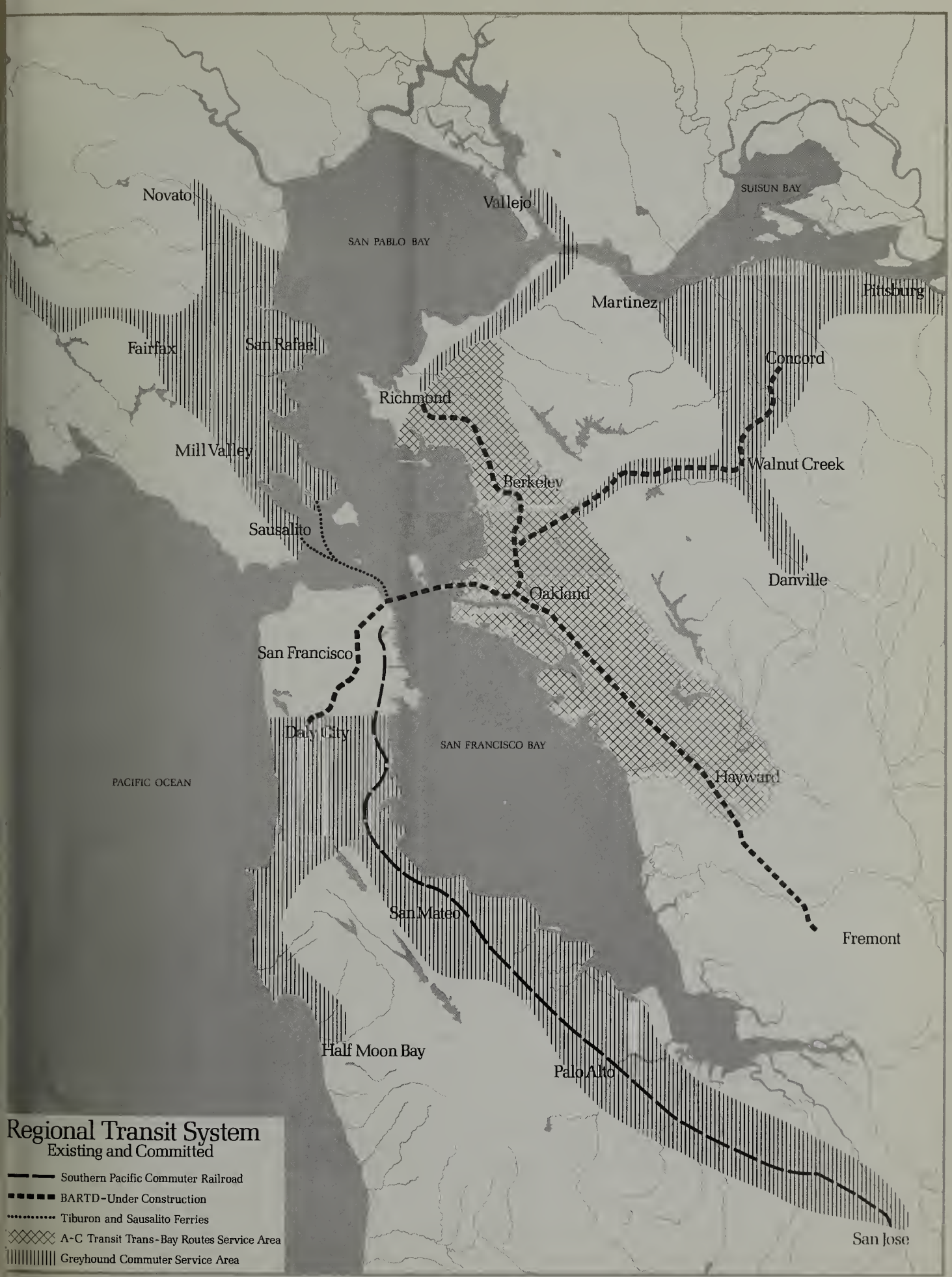
Two major freeways connect San Francisco with the Peninsula: the James Lick Bayshore Freeway (U.S. 101) from downtown and the east side of San Francisco along the Bay to San Jose; and the Southern-Junipero Serra Freeway (U.S. Interstate 280) linking downtown with southwest San Francisco and the coastside and western inland points of the Peninsula.

The San Bruno Mountains form an important physical barrier between San Francisco and the Peninsula. In addition to the James Lick Freeway, the old Bayshore Boulevard is a major arterial link east of this mountain barrier. Mission Street, Junipero Serra Boulevard, Alemany Boulevard, and Skyline Boulevard are major arterials to the west of the mountains which together with the Junipero Serra Freeway join this corridor with San Francisco.

The major vehicular route, the Bayshore Freeway, has recently been widened but operates at capacity during peak hours. The gradual opening of sections of the Southern Junipero Serra Freeway is providing some traffic relief. The Hunters Point Freeway, which is planned, would provide a route linking the Peninsula with the South Bayshore area, while serving the industrial districts of San Francisco. Any additional freeways from the Peninsula would require additional new freeway facilities in San Francisco.

MASS TRANSIT SYSTEM

Mass transit in the metropolitan area presently consists of several distinct systems. Each functions independently of others and the coordination of their activities is only incidental. There are presently three modes of transit in operation -- bus, ferry, and commuter railroad -- with a fourth, rapid transit, under construction. Commuter bus service links all three major suburban corridors with various downtown terminals, and the Southern Pacific commuter train service terminates in the south of Market fringe of downtown. Commuters either walk to their destinations or are distributed by the local Municipal Railway system of streetcars and buses.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San Francisco
Daly City
SAN FRANCISCO BAY
PACIFIC OCEAN
Hayward
San Mateo
Fremont
Half Moon Bay
Palo Alto
San Jose
Regional Transit System
Existing and Committed
Southern Pacific Commuter Railroad
BARTD-Under Construction
Tiburon and Sausalito Ferries
A-C Transit Trans-Bay Routes Service Area
Greyhound Commuter Service Area

With the exception of the Southern Pacific Railroad, no commuter service has an exclusive right-of-way for its routes. The bus systems are faced with the same congestion and delays as commuter automobiles and, therefore, offer the suburban commuter limited advantage over driving. Only minimal transit service is offered during off-peak daytime, evening, and weekend periods.

The BART system now under construction is the first step toward a metropolitan rapid transit system. The lines now under construction will link the East Bay, San Francisco, and Daly City and will provide continuous transit service.

North Bay

Transit service to the North Bay, with the exception of ferries to Sausalito and Tiburon, is provided by twenty Western Greyhound routes linking Marin County to San Francisco terminals at the Ferry Building and Seventh Street. The Golden Gate Bridge, Transportation and Highway District is planning to institute a new, expanded bus system which will replace the Marin Greyhound routes. Capacity is expected to be increased by 50 percent within the first year of operation over existing levels of bus service.

Ferry service has recently been expanded with the addition of a ferry between Sausalito and the Ferry Building. The service appears to be very popular because of the pleasure of the trip and its speed in relation to automobile and bus travel, given current congestion on the Golden Gate Bridge. Increased ferry service of undetermined capacity is planned by the Golden Gate Bridge, Transportation and Highway District. At present service is limited by the number of ferries available and the length of time required for a round trip. Possibilities for higher speed, water-based travel are being explored.

East Bay

The extensive AC bus system provides both local and transbay transit service to the portions of Alameda and Contra Costa counties west of the Berkeley Hills. Transbay service is primarily concentrated in the peak commute periods with limited service in off-peak hours. East of the Berkeley Hills, Western Greyhound provides limited commute period bus service to San Francisco from such major suburban communities as Orinda, Walnut Creek, and Concord.

Commuter bus ridership has been steadily increasing and garnering a larger share of total person trips. The BART system is planned to accommodate an estimated 71,600 person

trips daily in its transbay service in 1975 compared with the 1965 bus total of 41,600. BART lines will replace the existing Greyhound Contra Costa County service and probably 90 percent of AC transbay service. In addition BART will serve portions of southern Alameda County presently without major transit service.

Peninsula

Two transit systems, railroad and bus, presently connect San Francisco with the Peninsula. The Southern Pacific railroad line runs from Third and Townsend Streets to San Jose, serving the Bayside communities, and accounts for over 20,000 person trips daily into and out of San Francisco. Over 80 percent of this total travel occurs in the four peak hours of the day. Sparse service exists in off-peak hours because of the necessity to use the tracks for freight service. A further problem with service is caused by the peripheral terminal location, which requires many of the passengers to transfer to the Muni system for completion of their trips.

Western Greyhound offers bus service on six major routes serving both the Coast and Bay sides of the Peninsula and handles approximately 15,000 person trips daily to and from the San Francisco Seventh Street Greyhound Terminal. Slightly less than half of this total is carried during the peak periods. An additional limousine-bus service, the Airporter, serves San Francisco International Airport and carries over 3,000 passengers daily in each direction between the downtown San Francisco Airlines Terminal at Taylor and O'Farrell Streets and the Airport.

The present transit connections linking the surrounding suburban communities with San Francisco consist of a series of independent transit systems. The present systems suffer from a lack of coordination, lack of common terminals or interchange points, limited capacity and service, and traffic congestion.

The need to develop high speed transit on exclusive rights-of-way as part of a metropolitan-wide, coordinated transit system in conjunction with local transit is becoming more evident. The first germ of such a system is BART, which will relieve not only transit congestion from the East Bay but also vehicular congestion. Whether a similar type of relief will be provided to the two other major suburban corridors and whether such improvements will be coordinated with BART remain major questions.

AIRPORTS, STOLPORTS, AND HELIPORTS

Two major airports serve the San Francisco-Oakland metropolitan area: one near Millbrae on the Peninsula and another across the Bay near Oakland. The San Francisco International Airport is owned and operated by the Airports Commission of San Francisco. Expansion of the San Francisco airport is presently taking place to accommodate larger planes and increased air travel between San Francisco and national and international destinations. Access between the airport and San Francisco is limited to limousine-bus, taxi, and automobile.

No facilities presently exist in or near San Francisco for small airports, although possibilities are being considered for facilities for Short Take-off and Landing Craft (STOL Craft). These craft were originally intended to require runways of only 1,000 feet. Present developments indicate that twice that length will be required. The complexities relating to scarcity of vacant land and environmental problems make it questionable whether a suitable location will be found in San Francisco.

Helicopter service is presently planned on a limited basis between a site near Third Street and China Basin Channel and metropolitan points, primarily for light freight for downtown businesses. Passenger service formerly provided at the Ferry Building Heliport has been discontinued.

SAN FRANCISCO'S TRANSPORTATION SYSTEM

As the central city of a rapidly growing metropolitan area, San Francisco must service not only the transportation needs of its 700,000 residents but also the 300,000 commuters and visitors who enter the city every day. The existing transportation system is already overtaxed and major improvements are necessary. The local system, serving local travel and connecting in part to the metropolitan network, consists of the trafficways system, several forms of public transit, bus and rail terminals, parking facilities and sidewalks.

TRAFFICWAYS

The present trafficways system of San Francisco is primarily an unlimited access, surface-street system. The limited amount of freeway mileage within the city serves primarily for travel through, into, or out of the city. The street system is composed of vehicular paths of varying nature and capacity.

EXISTING MUNICIPAL RAILWAY TRANSIT SERVICE

Streetcars, Trolley Buses, Motor Coaches, and Cable Cars

Major Transfer Points

Most through arterials radiate from the downtown area to other parts of the city. Market Street, Geary, Mission, Potrero - Old Bayshore Boulevard, Third Street, the Embarcadero, and others are the major routes connecting downtown with the rest of the city and with elements of the metropolitan freeway network.

Through routes connecting the various districts of the city from north to south and east to west are less frequent than downtown-oriented radial arterials. Sunset Boulevard, Park Presidio Boulevard-Nineteenth Avenue, Castro-Divisadero, the Great Highway, Army Street, and Van Ness Avenue are the major cross-town routes.

PUBLIC TRANSIT

Mass transit is provided by the San Francisco Municipal Railway (Muni) on a basic system of 62 routes. The fleet of streetcars, cablecars, trolley buses and motor coaches carry over 475,000 passengers on a typical weekday. A flat fare of 25 cents is presently in effect.

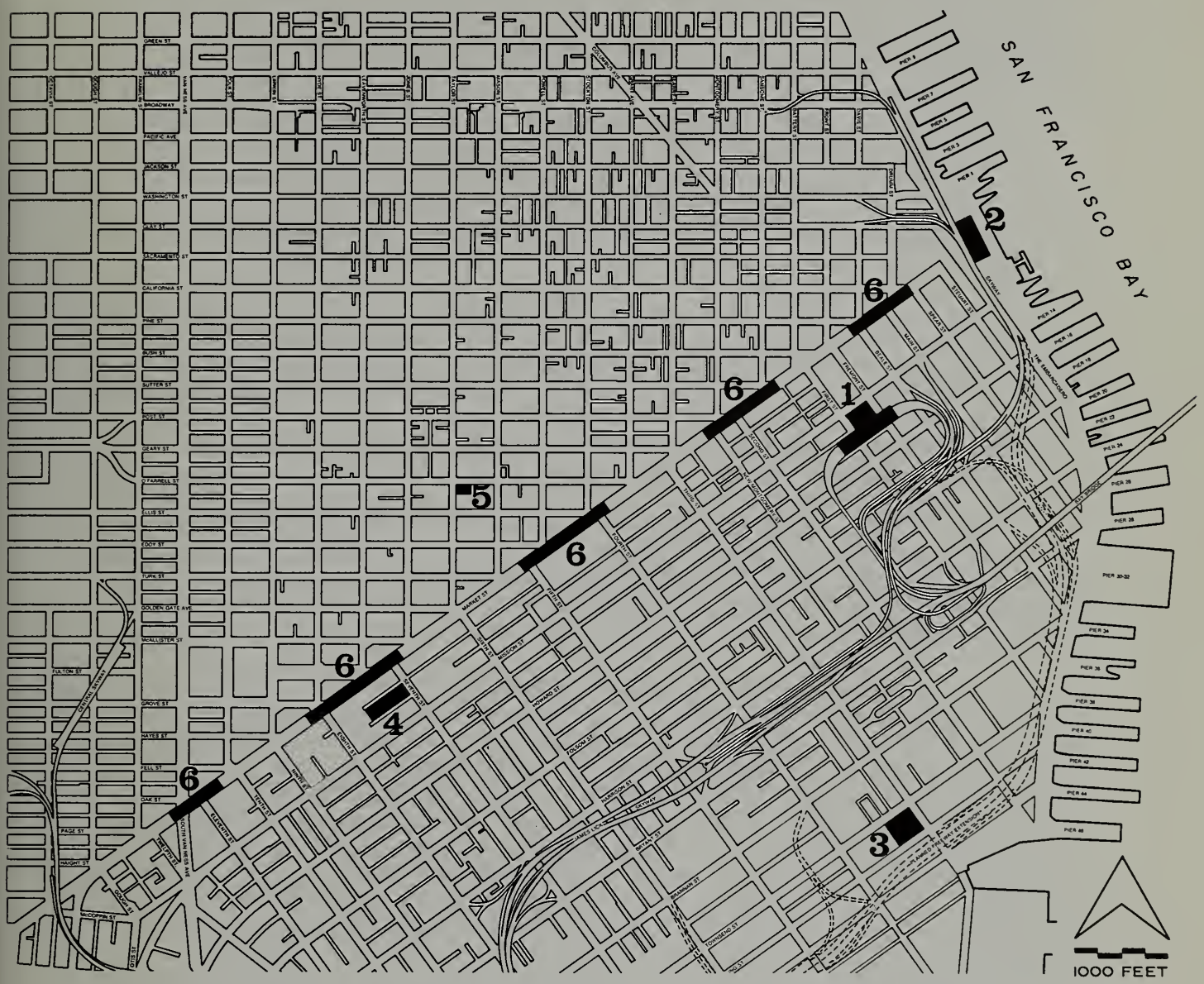
The relatively dense transit coverage provided by the Muni is a result of the physical compactness and the high population density of the city. The routes are strongly oriented toward the downtown area with 82.5 percent of the mileage operated and 87.6 percent of the aggregate passenger revenue accounted for by the 34 routes which enter downtown. The obsolete condition of rolling stock has hindered improvement in service in recent years. A massive equipment replacement program is now under way which will replace all the rolling stock except the cablecars. The new equipment, together with the streetcar subway now under construction, will permit improvement of service on existing lines and allow for additional or new service where demands warrant.

TERMINALS AND TRANSFER POINTS

Downtown San Francisco is dotted with transportation terminals which serve the various modes of commuter and intercity transit. The present locations of these facilities are more the result of historical events than of comprehensive planning.

The most important commuter facility is the Transbay Terminal at First and Mission Streets which handles an estimated 52,000 person trips daily on the AC and Greyhound bus systems. This terminal is located within easy walking distance of the financial district. It is presently well

DOWNTOWN TRANSPORTATION TERMINALS



1 TRANSBAY TERMINAL
- A-C Transit
- East Bay Greyhound
- Continental Trailways Bus
- Santa Fe Bus

2 FERRY BUILDING
- Marin Greyhound
- Sausalito and Tiburon Ferries

3 SOUTHERN PACIFIC R.R. DEPOT

4 SEVENTH ST. GREYHOUND DEPOT
- Intercity
- Peninsula
- East Bay
- Marin

5 AIR LINES BUS TERMINAL

6 BART-MUNI SUBWAY STATIONS

served by the Muni Railway with all streetcar lines and the Geary and Mission Street buses stopping at it. Recently the Continental Trailways bus system has relocated into the lower level of the terminal. The relatively infrequent schedules of this bus system generates only minor terminal demands.

The Third and Townsend Southern Pacific station handles over 20,000 commuter trips daily to and from the Peninsula. Because of the remote location of this facility, a majority of commuters to downtown must use the Muni system to reach their destinations. In inclement weather this puts an excessive strain on the Muni lines serving the depot.

The main Greyhound terminal at Seventh near Market serves the long-haul routes and is the commuter terminal for all Peninsula routes and for some East Bay and Marin routes. This terminal handles over 17,000 person trips daily. Origins or destinations in the Civic Center area are served by the Seventh Street terminal. The Greyhound Ferry Building terminal handles trips from Marin County to the downtown core.

The Airlines Terminal at Taylor and O'Farrell Streets serves 6,000 persons daily using buses for travel to and from the San Francisco and Oakland airports. A ferry slip at the Ferry Building is used for ferryboat service to Sausalito and Tiburon.

In the immediate future a dramatic shift in terminal facilities will take place. The four new BART stations on Market Street will handle most of the commuters presently served at the Transbay Terminal. The proposed bus and ferry services to Marin County which are now under consideration, if developed, will result in a redistribution of termini of North Bay commuters. A new airport bus terminal has been proposed for inclusion in the Yerba Buena Center redevelopment project just off Fourth and Market. Proposals to provide service to San Francisco International Airport portend a change in other travel patterns.

These developments and proposals indicate that there is an opportunity to overcome many of the existing terminal liabilities and relate commuter and long-distance traveler needs to the urban core structure. This unusual chance to maximize the benefits that can be accrued from proper terminal development and relationships should not be allowed to slip by.

Outside the downtown area there are no terminals as such, but there are points at which transfers can be made from one transit line to another. The more important

transfer points are usually where substantial numbers of routes cross so that several alternatives are available for movement from one part of the city to another.

The location of new BART stations will alter the potential pattern of transfer points. An opportunity will exist for creating connections between BART and local surface lines and for improving service among parts of the city distant from each other.

TAXIS AND JITNEYS

At present, between 600 and 700 taxis operate in San Francisco. One hundred permits for additional taxis were authorized in 1969 by the Board of Supervisors. Increases in hotel and office construction may increase the need for more taxis in the future.

Jitney buses, privately owned and operated, serve as inexpensive forms of transportation along Mission Street between downtown and Daly City. The jitneys provide rides at from 20 cents to 30 cents depending on the length of the trip. They stop wherever flagged but do not respond to telephone calls. They have operated on this basis with varying forms of vehicles for years. Permits are required for their operation, as in the case of taxis, and routes are regulated.

PARKING FACILITIES

San Francisco apparently has the highest density of automobile registration of any major city in the country. This fact raises not only questions of providing street capacities for automobile travel but also the problem of parking the vehicles when they are not in use.

Storage for private automobiles is provided in the city in two forms: on-street parking spaces and off-street parking lots and garages. Parking on the street is allowed in almost all residential areas throughout the city except on major routes during certain periods. Zoning provisions currently require at least one off-street parking space per dwelling unit in new construction, but because only a small percentage of the housing stock has come under this provision, parking spaces off the street remain considerably fewer than would be required if all the housing were built today.

As a result of growth in vehicle ownership by city residents, parking facilities for nighttime and daytime residential use are almost completely saturated in the higher density residential areas. Between 1958 and 1969, automobile ownership increased from 266,500 to 294,200 although population declined. However, trends over the past few years indicate that automobile registrations are leveling off. Ownership of other vehicles, such as trucks, buses, trailers, and motorcycles, contributed an additional increase of 12,000 vehicles between 1958 and 1969. Automobile density (automobile registrations per square mile) in the city has reached 6,257. For comparison, New York has an auto density of about 5,000 per square mile and Los Angeles a density of 3,000. Increasing demand for automobile storage near residences is being accommodated primarily by illegal parking on the sidewalks or in no-parking zones.

In commercial areas private businesses, private parking garages, and the San Francisco Parking Authority provide varying amounts of off-street parking. Because streets are heavily trafficked during business hours, parking on many streets in commercial districts is limited or prohibited.

The demand for facilities in the city is increased in the daytime by the demand from nonresidents. Downtown experiences the largest demand for parking facilities during the daytime from the combined impact of those attracted to this center from outside and inside the city. There are about 50,000 off-street parking spaces and an additional legal 11,000 on-street spaces in greater downtown. Within the downtown core, parking facilities, both on-street and off-street, legal and illegal, are used beyond their practical capacities. For the downtown as a whole, including South of Market, Nob Hill, and the Civic Center, the peak demand on parking supply reaches 80 percent of available supply.[1]

New downtown zoning requires review of the parking facilities included with new construction in the core area. Areas on the periphery which would be appropriate for long-term parking and which would intercept automobiles before they enter the congested high-density core have been suggested.

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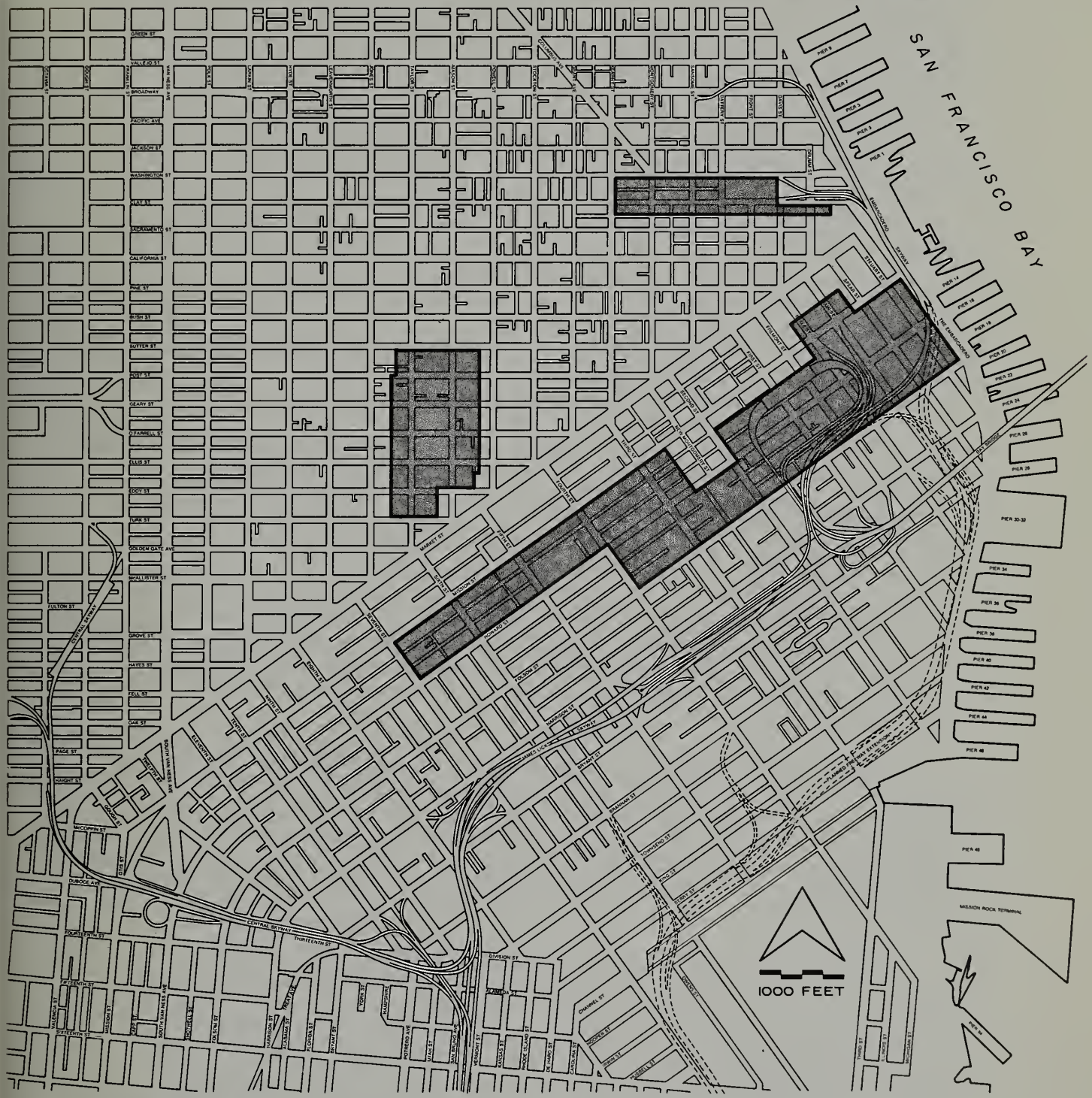
[1]Downtown Parking and Traffic Survey, Downtown Parking, November, 1966.

AREAS IN DOWNTOWN APPROPRIATE FOR NEW PARKING FACILITIES



Source: San Francisco Downtown Zoning Study
Final Report, 1966

During early evening hours, the heaviest concentration of demand for automobile storage is in the entertainment and shopping districts of downtown and in the Broadway entertainment district. During these periods, capacity of off-street and on-street facilities has apparently been reached during the tourist season and is close to being reached on weekends during the year.

SIDEWALKS

Walking is a favored, if often neglected, form of transportation in San Francisco. The sidewalk system provides the basic facility. In many areas, sidewalk widths are adequate to allow for relatively heavy pedestrian movement without interference with vehicular traffic or street-level commercial or residential activities. The heaviest demand on sidewalks is in the downtown area where sidewalks are often not as wide as those provided in residential areas because of smaller rights-of-way and sidewalk narrowing for wider streets over the years. As a result, sidewalks are used beyond their capacity during certain times, such as lunch hours and the early afternoon shopping peak period. This problem is fairly acute on streets in the financial district and certain parts of the shopping districts where public transit, pedestrians, and automobiles all compete for a limited amount of space between buildings.

One of the objectives of the Market Street Beautification Project is to increase space for pedestrians. Market Street will become the pedestrian-oriented spine of downtown, with 32-foot sidewalks and a variety of plazas to provide for downtown shoppers and employees.

Pedestrian traffic is also heavy, throughout the day and night, in the North Beach area and Chinatown. High density of residential population in these areas and major commercial attractions, in conjunction with the close physical proximity of activities, cause the large demand for pedestrian circulation. Sidewalks are generally narrow in this older part of the city.

In residential areas, although pedestrian traffic is generally not intense, except in high density neighborhoods, sidewalks are used constantly throughout the day by residents for amusement, conversing with neighbors, dog-walking and a variety of activities. They are also used in some medium- to high-density neighborhoods for frequent trips to stores, laundromats and homes of friends. Where vehicular traffic is also heavy, there are conflicts increasing accident hazards and interfering with normal sidewalk activity, except where

sidewalk widths are quite substantial. Since most school trips by children are made on foot, sidewalks are the primary facility for this travel. They also serve for frequent trips to nearby parks and recreational facilities.

In summary, San Francisco and the metropolitan area have a highly developed and varied transportation system with several modes of travel. However, growing travel demand in general and increasing automobile ownership in particular are straining existing facilities beyond capacities during hours of peak demand. Within San Francisco itself much improvement is required in coordination among transit systems and terminals, additions to rolling stock to increase speed and capacity, and improvements to the street system to channel vehicles in desired directions along chosen routes. The supply of parking facilities has been unable to keep up with the increase in automobile ownership, and many areas of the city do not have and probably will not have adequate parking in the future. Conflicts are occurring in the downtown area and in some other intensively developed parts of the city among various modes of travel -- transit, vehicular, and pedestrian.

In the next chapter a detailed analysis of travel demand, use of automobiles and public transit, and vehicular traffic into and within the city will be presented. In addition, future trends in travel demand will be related to the existing transportation system described in this chapter, to indicate where major problems can be expected to occur.

Present and Future Travel Patterns

In this chapter detailed information on travel patterns in San Francisco and between the city and suburban counties is presented. Seen within the context of the existing transportation system described in Chapter III, the patterns indicate where problems now exist in satisfying travel demand and where they are likely to exist in the future. Once the capacity of existing transportation facilities is compared with present and future demand for them, alternative means for satisfying travel demand can be considered in terms of efficiency and consistency with other community goals. These alternatives will be presented as issues in the last chapter, thus setting the framework for the establishment of basic objectives and policies for San Francisco's transportation system.

The sources for the data presented are noted in each table and described in more detail in Appendix B. The results of many studies of transportation have been used. Generally, three types of information have been available: (1) sample data on the origins and destinations of persons who travel during a typical weekday, according to the purpose of the trip, and the mode of transportation by which the trip was made; (2) measurements of vehicular traffic; and (3) cordon counts of persons entering and leaving downtown by mode of travel.

For purposes of understanding choices people make in how and where they travel, the existing patterns identified should be related to the existing transportation system. Current travel constitutes a manifestation of apparent, as contrasted with potential, demand for travel by a particular mode or route. This means that people are making choices in accordance with the available alternatives. While the information on origins and destinations provides more detailed information than measurements of vehicular flow or cordon counts on the routes which people might take if the transportation system were altered, it does not explain modal choices. These are determined in large part by the comparative convenience and desirability of available modes. In addition, none of the data can indicate with any certainty the travel which would occur if transportation were available for trips which are not now made because of its absence.

For major movements, such as work trips, problems in identifying potential demand are somewhat alleviated by

knowledge of locations of employment. The same applies to other movements in which substantial numbers of people participate, such as weekend travel to Marin County and Golden Gate Park. Ideally, there would be more specific information on demand for travel opportunities by direction, mode, time of day, and purpose. Because such data can only be produced by complex, widespread and elaborate surveys of residents and business firms, it is necessary to rely on knowledge of existing travel, past behavior and future trends which may alter travel behavior or travel patterns.

Projections of travel demand are difficult to make; however, an attempt has been made to outline future trends in accordance with knowledge beyond that proceeding from analysis of existing travel alone or past travel behavior. Growth of employment and population, normal relationships between population characteristics, desired work opportunities, and other travel desires are among the factors which have been considered.

For ease of understanding and in accordance with the nature of travel patterns, the analysis of existing and future travel patterns is presented within two geographically defined categories: (1) downtown-oriented travel and (2) non-downtown travel. Within each of these categories, a distinction based on travel purpose is made between work trips and non-work trips and another based on time of travel between peak-period and 24-hour trips.

Downtown-oriented travel is isolated for special attention because of the extremely large number of trips attracted to the relatively small downtown area from the rest of the city and the metropolitan area. Trips made to downtown are substantial both for work and non-work purposes because of the concentration of employment, shopping, entertainment, tourist attractions, and other activities common to a regional center. Non-downtown travel is growing in importance in the region as a whole and in San Francisco as the result of decentralization of employment and non-work trip attractions. This category includes travel to and from employment, recreation facilities, shopping, hospitals, and other trip attractors throughout the city by residents and nonresidents, reverse commuting by San Franciscans to other counties, and other travel to outlying counties.

Special attention is given to work trips. Work trips are an important single category because of the importance of access to employment and because of the concentration of these trips during limited periods during the day, called the peak periods: during the morning from 7 a.m. to 9 a.m. and during the afternoon from 4 p.m. to 6 p.m. Since most

peak period travel is to and from work, data on employment are used as a basis for projections. The concentration of this large number of trips during a few hours causes special problems of facilities capacity. Non-work trips tend to be spread more evenly throughout the day and evening and are represented by data on 24-hour travel, although there is some peaking, such as for shopping trips to downtown in the early afternoon or recreational trips on the weekend. In past transportation planning, very little attention has been given to non-work trips because of their lack of significance in terms of capacity of roadways or transit vehicles. As leisure time has increased, shopping and recreational opportunities become more dispersed, and mobility augmented, trips for social, recreational, shopping and personal business purposes have been increasing relative to work trips. Although problems of capacity are not arising where facilities are provided to handle peak-hour demand, there are problems in terms of both availability and capacity of facilities where the direction of travel is different from that during the peak hours.

DOWNTOWN-ORIENTED TRAVEL

Downtown[1] San Francisco is the economic and cultural center of the Bay Area and is therefore the desired terminal of an extraordinary number of trips each day from other parts of the city and region. Over 890,000 trips into, out of, and through downtown were recorded between 10 a.m. and 6 p.m. in 1965, an increase of almost 80,000 trips since 1959.[2]

THE SAN FRANCISCO DOWNTOWN

Downtown and adjacent areas contain more than just the high density core of offices, retail and hotel-entertainment areas. Major concentrations of activity are found in the government complex at Civic Center; significant retail, entertainment and tourist activity occurs in the Chinatown

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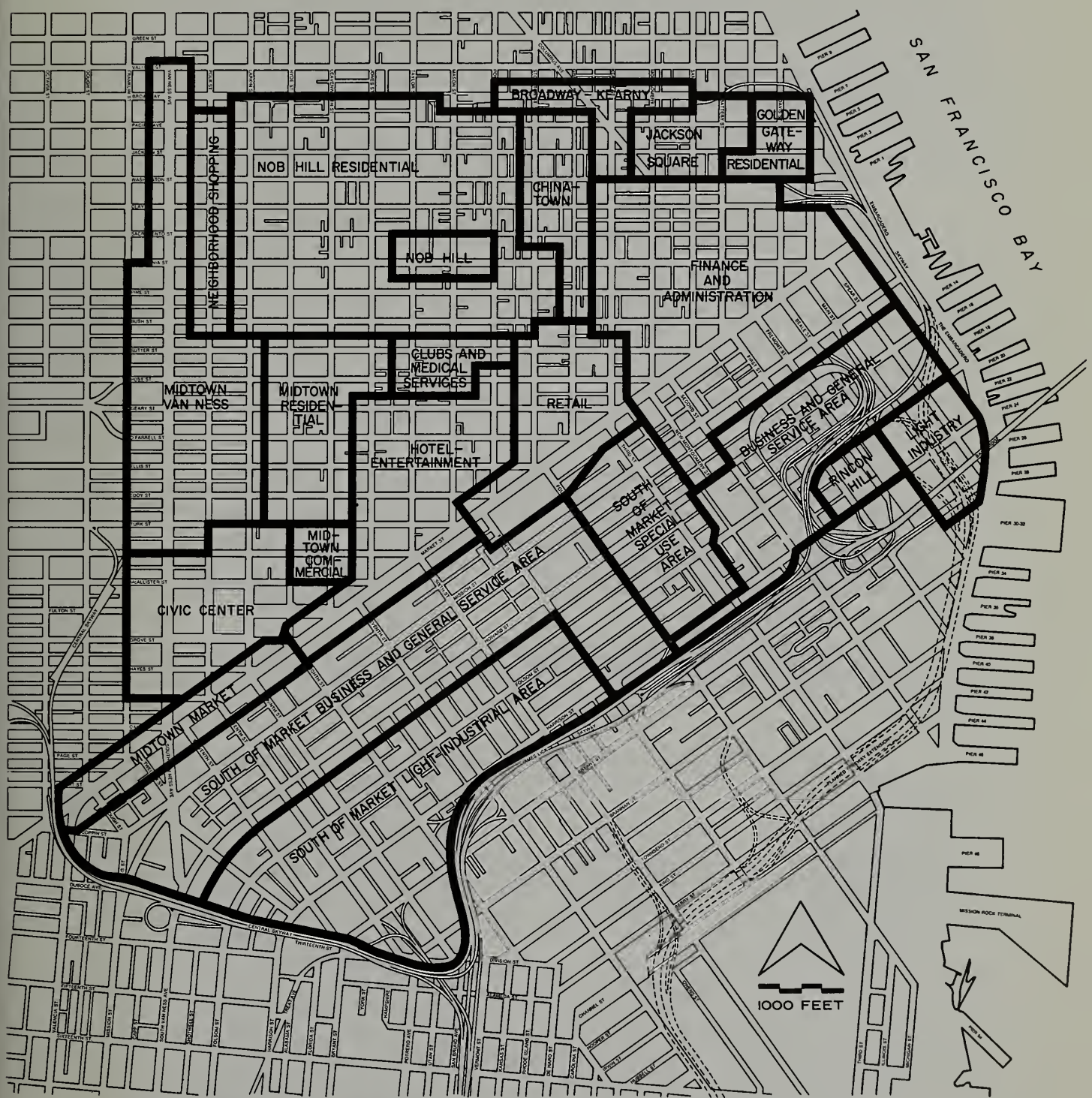
[1]See Appendix B for definition of the boundaries of downtown for purposes of travel analysis in this report. The area described is substantially larger than the "downtown core" of financial activities and shopping and different from downtown as defined in the City Planning Code.

[2]Downtown Parking and Traffic Survey, Cordon Counts, 1959 and 1965.

DOWNTOWN FUNCTIONAL AREAS AND NEIGHBORHOODS



Note: As Delineated in the 1963 Downtown General Plan

and Broadway areas; service and manufacturing industries as well as general office functions are found in the South of Market area. This latter area represents the largest potential area for future core development and is beginning a major revitalization. The new Fifth Street and Seventh Street extensions at Market Street provide much needed improvements to connect the area with the more heavily developed blocks to the north. The Yerba Buena Center redevelopment project, which will provide the city with its major convention center, a sports arena and hotel and office space, is the nucleus of the physical rejuvenation of the South of Market.

Residential concentrations are also located in and near downtown in the Nob Hill, Golden Gateway, Chinatown, Midtown and South of Market areas. In 1960, the residential population of downtown was 74,613 persons housed in 56,039 housing units. Since 1960, 2271 housing units have been added to the area, primarily in the Golden Gateway and on Nob Hill. Growth in residential population can be expected from the addition of buildings in the Golden Gateway residential project, new developments proposed in the Northern Waterfront Plan, and other highrise developments in existing residential areas.

In addition to the permanent residents of downtown, the tourists, conventioneers and business visitors form a significant transient resident population downtown; there are approximately 12,000 rooms now existing in major hotels and over 4,000 more are under construction, with another 5,000 in planning stages.

Employment in downtown is presently estimated at almost 300,000 jobs. By 1990 over 100,000 jobs are projected to be added.

Because downtown employment represents such a substantial proportion of total employment in San Francisco and because of the concentration of that employment within a relatively small area, trips to and from work in downtown are the major source of congestion in the city. Projections of future employment indicate that it will remain the most critical problem area in the city.

Table 5

PRESENT AND FUTURE DOWNTOWN AND TOTAL
SAN FRANCISCO EMPLOYMENT

	EMPLOYMENT			Net Change		
	1970	1980	1990	1970-80	1980-90	1970-90
Downtown	299,800[a]	332,000[b]	405,000[b]	32,200	73,000	105,200
Percent of Total	55%	56%	58%	--	--	--
Outside Downtown	242,200	260,000	309,000	17,800	49,000	66,800
Total City	542,000[a]	592,000[c]	714,000[c]	50,000	122,000	172,000

Sources: (a) Wilbur Smith and Associates, Statistical Abstract, Four County Community Shelter Plan, May, 1970.

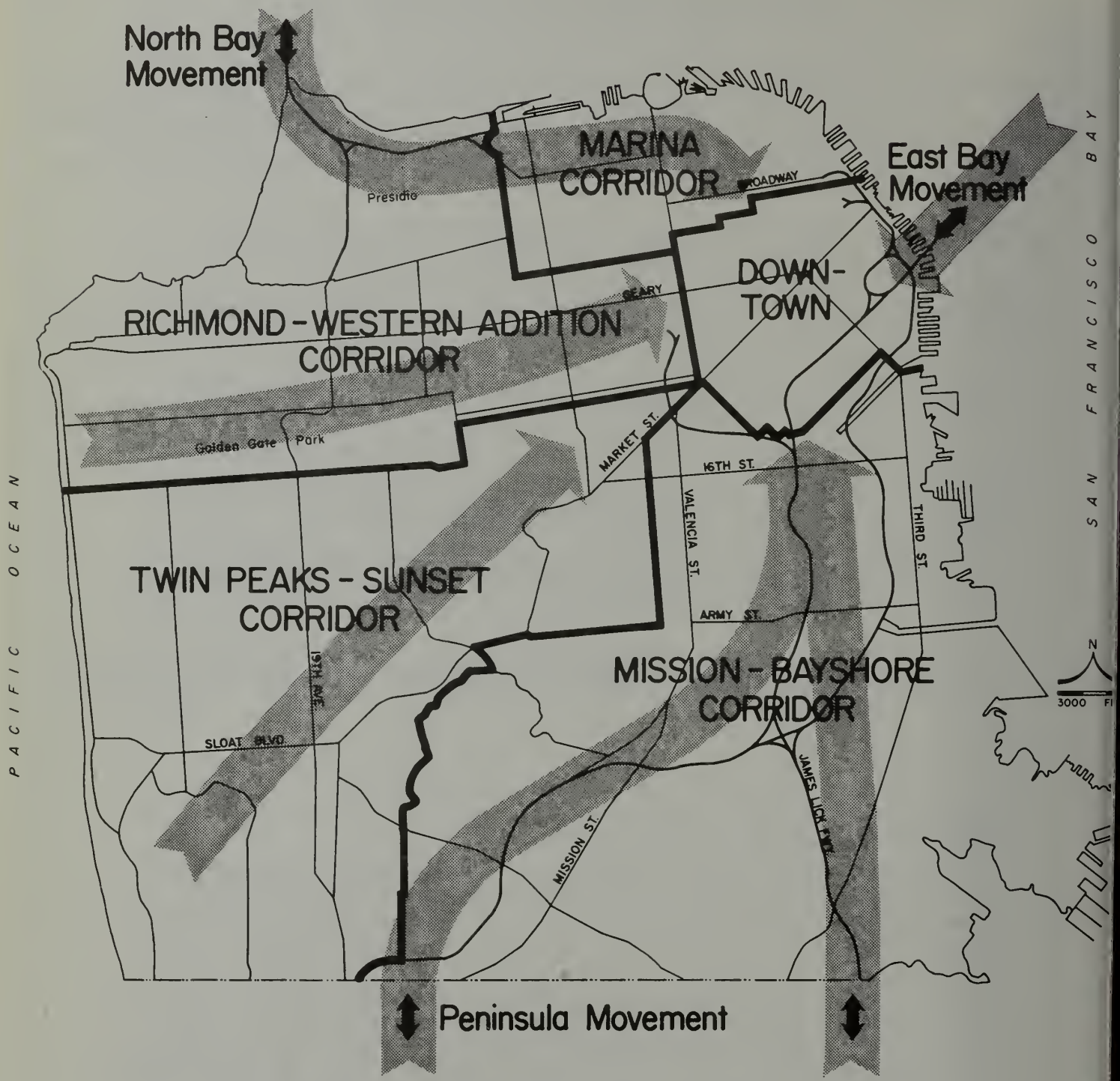
(b) Department of City Planning estimate based on Northern California Transit Demonstration Project, Final Report, 1967.

(c) Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969, for 1980 and 1990 totals.

DOWNTOWN MOVEMENTS BY CORRIDORS

As a result of the position of downtown in relation to the existing and committed transportation network, seven separate corridors of movements to and from downtown can be distinguished: (1) East Bay to the east, (2) Peninsula and (3) Mission and Bayshore to the south, (4) Twin Peaks and Sunset to the southwest, (5) Richmond-Western Addition to the west, and (6) Marina and (7) North Bay to the north. Some of these travel movements follow a linear corridor development while others drain broad geographic areas. Four are city and three are suburban in origin, although suburban and city movements combine in the northern and southern corridors.

TRAVEL CORRIDORS FOR DOWNTOWN DESTINATIONS



The following tables and maps summarize travel to downtown for all corridors by mode and purpose. Each corridor is analyzed in detail in the following sections.

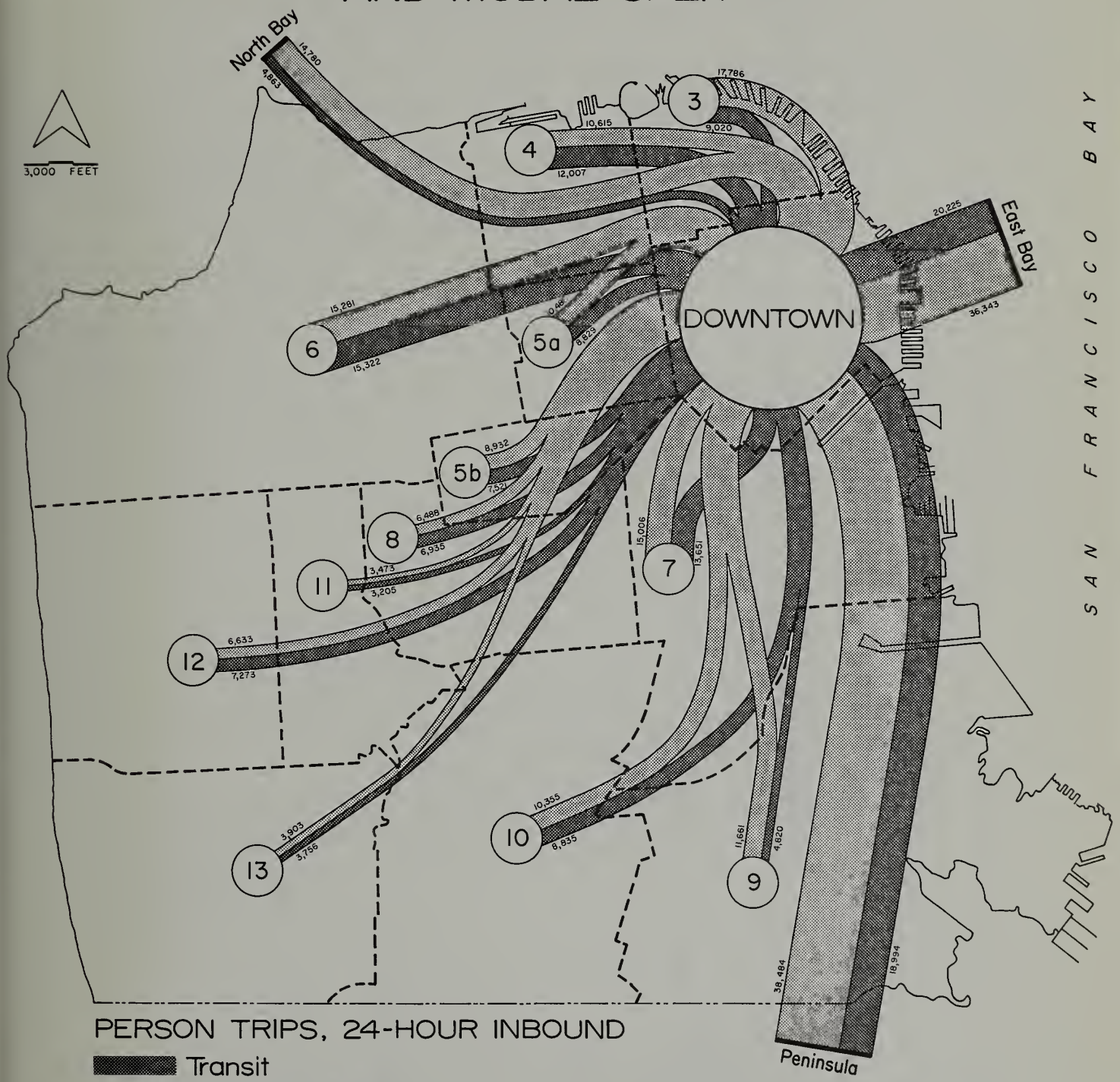
Table 6

AVERAGE WEEKDAY TRAVEL TO DOWNTOWN
PERSON TRIPS BY MODE AND PURPOSE, 1965

Origin by Corridor/Zone	Work Trips			Non-Work Trips			All Trips		
	Auto	Transit	Total	Auto	Transit	Total	Auto	Transit	Total
Mission-Bayshore	20,848	17,778	38,626	16,114	9,528	25,642	36,962	27,306	64,268
Mission-Potrero (7)	8,126	8,899	17,025	6,820	4,752	11,572	14,946	13,651	28,597
South Bayshore (9)	6,533	3,492	10,025	5,128	1,328	6,456	11,661	4,820	16,481
Outer Mission (10)	6,189	5,387	11,576	4,166	3,448	7,614	10,355	8,835	19,190
Twin Peaks-Sunset	15,484	18,313	33,797	13,865	10,377	24,242	29,349	28,690	58,039
Buena Vista (5b)	4,300	4,366	8,666	4,632	3,155	7,787	8,932	7,521	16,453
Twin Peaks (8)	3,155	4,494	7,649	3,253	2,441	5,694	6,408	6,935	13,343
Inner Sunset (11)	1,962	1,907	3,869	1,511	1,298	2,809	3,473	3,205	6,678
Outer Sunset (12)	4,342	5,102	9,444	2,291	2,171	4,462	6,633	7,273	13,906
Lake Merced (13)	1,725	2,444	4,169	2,178	1,312	3,490	3,903	3,756	7,659
Richmond-Western Addition	12,753	13,116	25,869	13,014	11,035	24,049	25,767	24,151	49,918
Western Addition (5a)	5,048	5,126	10,174	5,438	3,703	9,141	10,486	8,829	19,315
Richmond (6)	7,705	7,990	15,695	7,576	7,332	14,908	15,281	15,322	30,603
Marina	13,100	13,750	26,850	15,301	7,277	22,578	28,401	21,027	49,428
North Beach-Russian Hill (3)	7,704	4,811	12,515	10,082	4,209	14,291	17,786	9,020	26,806
Marina-Pacific Heights (4)	5,396	8,939	14,335	5,219	2,068	8,287	10,615	12,007	22,622
City Total	62,185	62,957	125,142	58,294	38,217	96,511	120,479	101,174	221,653
Peninsula	24,834	15,284	40,118	13,650	3,710	17,360	38,484	18,994	57,478
East Bay	22,589	17,848	40,437	13,754	2,377	16,131	36,343	20,225	56,568
North Bay	11,532	3,847	15,379	3,248	1,016	4,264	14,780	4,863	19,643
Suburban Total	58,955	36,979	95,934	30,652	7,103	37,755	89,607	44,082	133,689
TOTAL	121,140	99,936	221,076	88,946	45,320	134,266	210,086	145,256	355,342

Source: Bay Area Transportation Study Commission computer tabulations.

1965 DAILY TRIPS TO DOWNTOWN AND MODAL SPLIT



PERSON TRIPS, 24-HOUR INBOUND

Transit

Auto and Truck

(3) BATSC Zone of Origin

1965 BATSC Home Interview Data
TOTAL PERSON TRIPS: 355,500

Table 7

AVERAGE WEEKDAY TRAVEL TO DOWNTOWN
PERCENTAGE BY MODE BY PURPOSE, 1965

Corridor	Work Trips		% Work of All Trips	Nonwork Trips		% Nonwork of All Trips	All Trips		
	Auto	Transit		Auto	Transit		Auto	Transit	Total
Mission-Bayshore	54	46	60	63	37	40	58	42	100
Twin Peaks-Sunset	46	54	58	57	43	42	51	49	100
Richmond-Western Addition	49	51	52	54	46	48	52	48	100
Marina	49	51	54	68	32	46	57	43	100
City Total	50	50	57	60	40	43	54	46	100
Peninsula	62	38	70	79	21	30	67	33	100
East Bay	56	44	70	85	15	30	64	36	100
North Bay	75	25	78	76	24	22	75	25	100
Suburban Total	61	39	72	81	19	28	67	33	100
TOTAL	55	45	62	66	34	38	59	41	100

Source: Table 6.

Table 8

PERCENTAGE OF ALL TRIPS REPRESENTED
BY EACH CORRIDOR BY PURPOSE AND MODE

Corridor	Work Trips	Nonwork Trips	Auto Trips	Transit Trips	All Trips
Mission-Bayshore	17%	19%	18%	19%	18%
Twin Peaks-Sunset	15	18	14	20	16
Richmond-Western Addition	12	18	12	17	14
Marina	12	17	14	14	14
Subtotal City	57	72	58	70	62
Peninsula	18	13	18	13	16
East Bay	18	12	17	14	16
North Bay	7	3	7	3	6
Subtotal Suburbs	43	28	42	30	38
TOTAL	100%	100%	100%	100%	100%

Source: Table 6.

Table 9

TRAVEL TO DOWNTOWN FROM NON-DOWNTOWN CITY CORRIDORS
RELATIVE TO POPULATION AND HOUSEHOLDS

	Ratios(a)(b)			
	Work Trips per		Nonwork Trips per	
Corridor	Households	Population	Households	Population
Mission-Bayshore	.50	.17	.33	.11
Twin Peaks-Sunset	.44	.16	.31	.12
Richmond-Western Addition	.46	.19	.43	.17
Marina	.63	.31	.53	.26
City Average	.49	.19	.38	.15

Sources: (a) Population and households for 1960 from U. S. Census.
(b) Trips for 1965 from Bay Area Transportation Study Commission.

Table 10

EVENING PEAK PERIOD TRAVEL OUTBOUND FROM DOWNTOWN, PERSON TRIPS BY MODE, 1965, 4 TO 6 P.M.

Travel Destination	Auto	%	Transit	%	Total	% of Total
East Bay	16,610	51	15,656	49	32,266	19
Peninsula	14,246	50	14,277	50	28,523	17
Mission-Bayshore	13,070	48	14,196	52	27,266	16
Twin Peaks-Sunset	10,501	39	16,606	61	27,107	16
Richmond-Western Addition	8,442	42	11,716	58	20,158	12
Marina	9,766	42	13,218	58	22,984	13
North Bay	8,712	69	3,884	31	12,596	7
TOTAL	81,348	48	89,553	52	170,900	100

Source: Bay Area Transportation Study Commission computer tabulations.

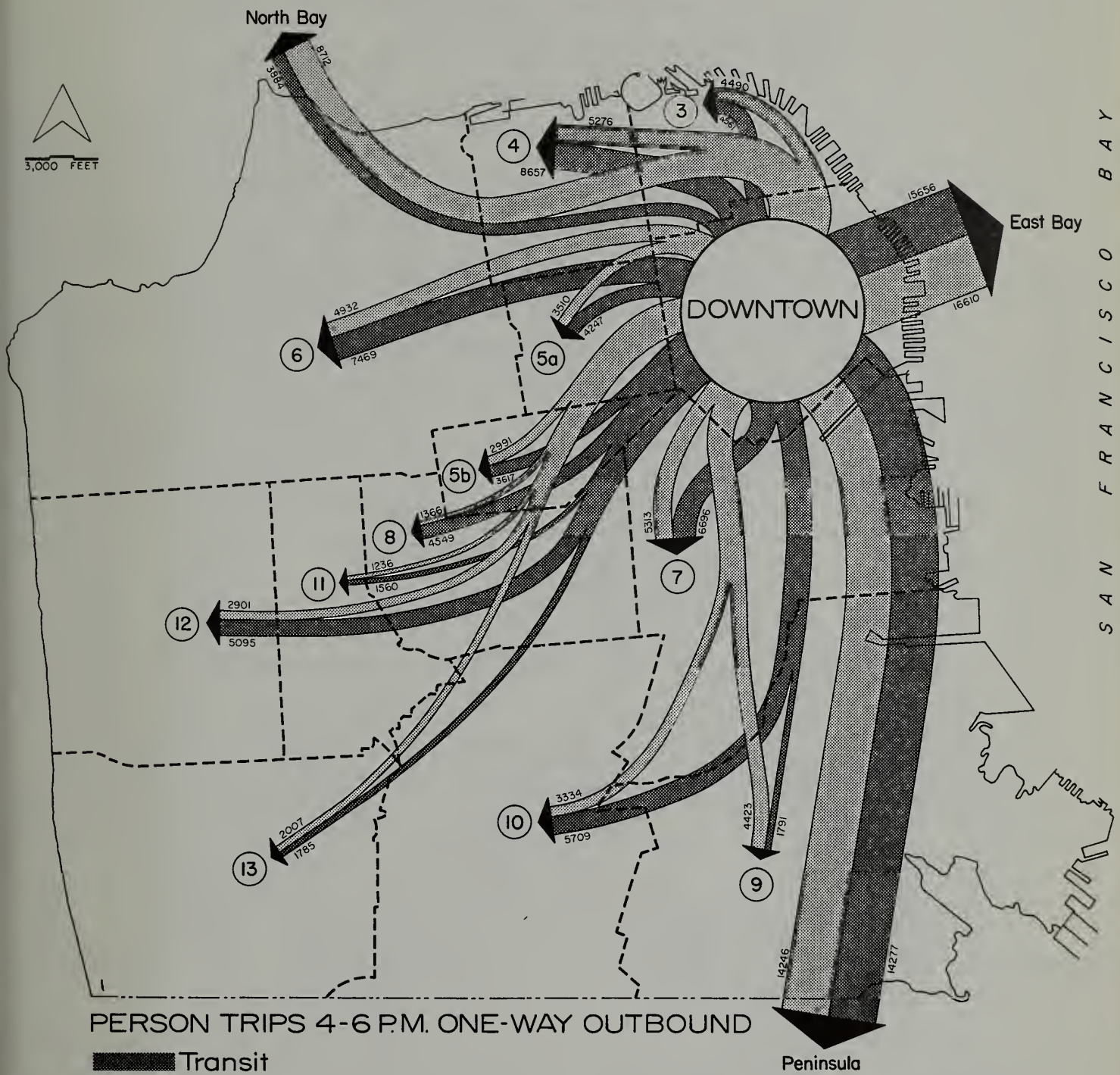
Table 11

EVENING PEAK-PERIOD TRAVEL FROM DOWNTOWN AS PERCENTAGE OF TWENTY-FOUR HOUR UNIDIRECTIONAL TRAVEL, PERSON TRIPS BY MODE

	Auto %	Transit %	Total %
East Bay	46	77	57
Peninsula	37	75	50
North Bay	35	80	64
Suburban Total	44	77	55
Mission-Bayshore	35	52	42
Twin Peaks-Sunset	36	58	47
Richmond-Western Addition	33	49	40
Marina	34	63	46
City Total	35	55	44
TOTAL	39	62	48

Source: Tables 6 and 10.

1965 DOWNTOWN EVENING PEAK PERIOD TRIPS AND MODAL SPLIT



PERSON TRIPS 4-6 P.M. ONE-WAY OUTBOUND

Transit

Auto and Truck

(3) BATSC Zone of Destination

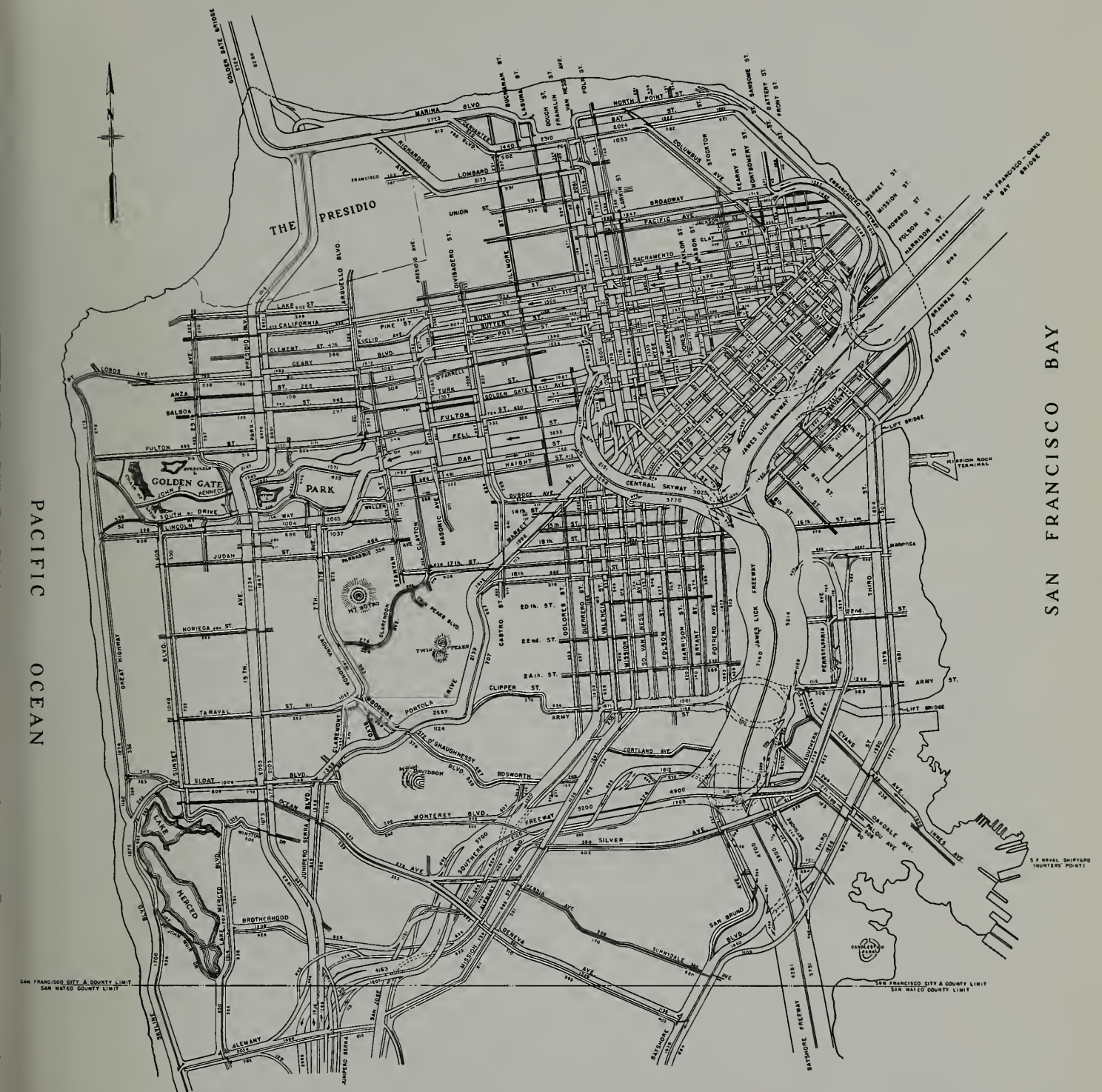
1965 BATSC Home Interview Data
TOTAL PERSON TRIPS: 170,900

CITY & COUNTY OF SAN FRANCISCO

TWENTY-FOUR HOUR TRAFFIC FLOW

ON PRINCIPAL STREETS & HIGHWAYS

1966 - 1968



NOTES

1. FIGURES SHOWN ARE ACTUAL TRAFFIC COUNTS TAKEN IN THE EVENING PEAK HOUR AT VARIOUS TIMES IN THE YEARS 1966 -1967 -1968, UNADJUSTED AS TO AVERAGE DAILY TRAFFIC.
2. LOCATION OF STREETS AND FREEWAY RAMPS ARE DIAGRAMMATIC ONLY.
3. MAJOR ONE-WAY TRAFFIC FLOWS ARE SHOWN BY DIRECTION ARROW.

CITY & COUNTY OF SAN FRANCISCO

EVENING PEAK HOUR TRAFFIC FLOW

ON PRINCIPAL STREETS & HIGHWAYS

1966 - 1968

DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
DIVISION OF TRAFFIC ENGINEERING

DRAWN BY YTF DECEMBER 1968

East Bay Corridor

Travel between the East Bay and San Francisco, whether oriented to downtown or other parts of the city, is entirely by way of the San Francisco-Oakland Bay Bridge, except for an insignificant number of trips which enter the city via the San Mateo-Hayward Bridge. The construction of the BART tube will be the significant additional facility for this transbay movement. If the India Basin Bridge (Southern Crossing) is built, it will provide for travel between San Francisco and the East Bay but will not directly serve downtown.

Amount and Purpose of Travel. In 1965, 56,000[1] daily trips were made to downtown from East Bay communities for all purposes (Table 6). Almost 70 percent of these trips were made to work, with downtown attracting nearly two-thirds of all East Bay commuters.[2] Employment of East Bay residents in the city appears to have nearly doubled between 1960 and 1965.

Table 12

EAST BAY RESIDENTS EMPLOYED IN SAN FRANCISCO

County	1960(a)	1965(b)	% Increase
Alameda	25,000	43,960	76%
Contra Costa	10,000	21,080	111%
Solano	1,000	2,850	119%
Napa	---	660	---
Total	36,000	68,550	90%

Sources: (a) U.S. Bureau of the Census, Census of Population, 1960.
(b) Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

[1]Within the text, numbers are rounded from the tables. Average daily weekday trips to work never equal total commuters because some commuters hold two jobs, commute less than once every weekday, or work on the weekend.

[2]Appendix, Table C-2.

Alameda County, with 57 percent of the four-county population in 1965, accounted for just over its share of commuters. Contra Costa commuting doubled between 1960 and 1965.

Non-work trips from the East Bay to downtown amounted to 16,100 in 1965, 43 percent of all East Bay non-work trips to the city as a whole.[1] These trips represented 40 percent of all non-work trips to downtown from outside the city (Table 8).

Modal Split. Sixty-four percent of all trips to downtown from the East Bay were made by automobile in 1965. Transit use was higher for work trips, producing a modal split of 56 percent auto and 44 percent transit. Eighty-five percent of non-work trips to downtown were made by automobile (Table 7).

Transit use for trips to downtown is higher for East Bay residents than for other suburbanites, but substantially lower than for city residents. Whereas East Bay riders have connections to their destinations from the downtown transit terminal almost as convenient as city residents, fewer can reach a transit stop in the East Bay by walking because of more dispersed origins.

Table 13

MEANS OF TRAVEL TO AND FROM TRANSIT VEHICLES, EAST BAY TRAVEL TO SAN FRANCISCO AND RESIDENT TRAVEL COMPARED

	Percent of Riders Reaching Transit Stop by:		
	Walking	Automobile	Other
AC Transbay riders	65.2	20.4	14.4
Muni riders	81.8	5.3	12.9
	Percent of Riders Reaching Destination by:		
	Walking	Other Transit	Other
AC Transbay riders	58.0	38.5	2.5
Muni riders	61.9	35.9	2.2

Source: Northern California Transit Demonstration Project, Final Report, 1967.

[1] Appendix, Table C-2.

Peak-Period Travel. Slightly over 32,000 trips to the East Bay from downtown were made during the afternoon peak period in 1965, the highest number of any corridor and 57 percent of all unidirectional trips between the East Bay and downtown (Tables 10 and 11). Three-fourths of these trips were from places of work (24,900).[1] Trips during this peak period were almost equally split between autos and transit.

Table 14

PERSON TRIPS BY AUTO, TRUCK, AND TAXI
FROM DOWNTOWN TO THE EAST BAY,
4 TO 6 P.M., WEEKDAY, 1965

	To East Bay Counties				
Downtown Origin	Alameda	Contra Costa	Solano	Napa	Total
South of Market	5,554	2,637	76	0	8,267
North of Market	6,036	2,062	192	53	8,343
Total	11,590	4,699	268	53	16,610

Source: Bay Area Transportation Study Commission computer tabulations.

Table 15

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE EAST BAY,
4 TO 6 P.M., WEEKDAY, 1965

	To East Bay Counties				
Downtown Origin	Alameda	Contra Costa	Solano	Napa	Total
South of Market	4,221	1,615	190	0	6,026
North of Market	6,690	2,279	553	108	9,630
Total	10,911	3,894	743	108	15,656

Source: Bay Area Transportation Study Commission computer tabulations.

[1]Bay Area Transportation Study Commission computer tabulations.

Table 16

PERCENTAGE MODAL SPLIT, PERSON TRIPS FROM DOWNTOWN TO EAST BAY, 4 TO 6 P.M., WEEKDAY, 1965

	East Bay County Destination									
	Alameda		Contra Costa		Solano		Napa		Total	
Downtown Origin	Auto	Transit	Auto	Transit	Auto	Transit	Auto	Transit	Auto	Transit
North of Market	57	43	62	38	29	71	0	0	58	42
South of Market	47	53	48	52	26	74	33	67	46	54
Total	52	48	55	45	27	73	33	67	51	49

Source: Tables 14 and 15.

Residents of Alameda and Contra Costa counties account for almost all of the peak-period trips made by both modes from downtown. Two-thirds of all trips are made by residents of Alameda County alone. As a result, the split of travel between modes during this critical period is primarily determined by choices made by residents of that county.

Auto use is higher for non-work trips, some of which are included in total peak-period travel. The higher automobile usage for origins in downtown north of Market Street indicates the higher number of non-work trips generated by the shopping and entertainment areas, the lesser importance of travel costs to office workers and businessmen in the North of Market area than to industrial workers in South of Market, and the more convenient location of the Transbay Terminal to South of Market work places.

Transit usage during the afternoon peak period has been increasing since 1965 for East Bay travel due to increasing congestion on the Bay Bridge and in downtown.

Table 17

VEHICLE COUNTS AND TRANSIT TRIPS ON BAY BRIDGE
EVENING PEAK OUTBOUND, 1965 - 1968

Transit Trips	Two Hour 4 to 6 p.m.	One Hour 5 to 6 p.m.
1965[a]	12,950	9,710
1967[b]	14,554	10,864
1968[c]	15,394	11,268

Vehicle Counts	4 to 6 p.m.	4:30-5:30 p.m.
1965[a]	13,571	7,130
1967[b]	16,041	8,321
1968[c]	14,022	8,050

Sources: (a) Downtown Parking and Traffic Survey, Cordon Count, April 7, 1965. Cordon count data do not match origin-destination data for transit trips because of differences between times of leaving origins and times of crossing the Bridge.

(b) University of California ITTE Traffic Survey, Series A 29, October 18, 1967.

(c) University of California ITTE Traffic Survey, Series A 30, April 17, 1968.

Vehicular traffic on the Bay Bridge appears to have reached its limit during the peak period. The excess of 1,600 vehicles per lane in the peak direction[1] is one measure

[1]Theoretical capacity at normal headways.

of congestion. However, the slow-moving traffic observed on working days using the city street and highway approaches to the Bridge is the key indication.

Sixty percent of peak period travel across the Bridge in the afternoon originates in downtown.[1] This indicates the importance of downtown-generated travel as a major cause of congestion on the Bridge during the peak periods. Downtown-oriented travel competes with travel from other parts of the city and from the Peninsula during this period. Since better transit service is available from downtown, the modal split favors transit more than for travel originating outside downtown.

Most non-work trips to downtown are made during non-peak hours, primarily by automobile.[2] In addition, 90 percent of East Bay trips to non-downtown destinations are by automobile.[3] As a result, in contrast to the peak period situation, daily automobile traffic has continued to increase on the Bridge. Transit trip increases have been almost all confined to the peak periods.

Table 18

TWENTY-FOUR HOUR TRAVEL ACROSS THE BAY BRIDGE, BOTH DIRECTIONS, 1965 - 1968

	Transit Person Trips	Vehicle Counts
1965	41,595(a)	135,781(b)
1967	47,151(c)	155,522(c)
1968	51,809(d)	161,862(d)

Sources: (a) Northern California Transit Demonstration Project, Final Report, 1967.
(b) Bay Toll Crossings, Southern Crossing, 1966.
(c) University of California ITTE Traffic Survey Series A 29, October 18, 1967.
(d) University of California ITTE Traffic Survey Series A 30, April 17, 1968.

[1]Bay Area Transportation Study Commission computer tabulations. Total afternoon peak-period travel was 47,818 person trips in 1965, of which 32,266 were trips from downtown.

[2]Bay Area Transportation Study Commission computer tabulations; and see Table 7.

[3]Appendix, Table C-2.

The Bay Bridge remains the most heavily used crossing in the region. It is clear that the automobile remains the predominant mode of travel between the two sides during the non-peak hours for downtown as well as non-downtown travel.

Future Trends. Population in the East Bay counties has been projected to increase by 76 percent between 1965 and 1970.

Table 19

PROJECTED POPULATION OF EAST BAY COUNTIES, 1990

	1965	1990	Increase 1965-1990
Alameda	1,092,200	1,680,600	588,400
Contra Costa	530,400	1,080,000	549,600
Napa	61,800	139,800	78,000
Solano	149,400	315,800	166,400
Total	1,833,800	3,216,200	1,382,400

Source: Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

Since growing sources of employment exist in the East Bay, an increase in East Bay residents does not necessarily mean an increase in commuting. However, because the East Bay labor force will increase faster than population, it has been estimated that net out-commuting from the East Bay will increase by 60,000 persons.[1] The actual number commuting out will be larger since some will be commuting in from other counties. Whether commuting from the East Bay to San Francisco continues to increase will be determined primarily by the growth of employment opportunities here relative to other parts of the region, since transportation will be adequate.

At the present time, San Francisco appears to attract about 78 percent of all East Bay residents who commute across

[1]Bay Area Transportation Study Commission, Bay Area Transportation Report, p. 45.

the Bay. Three-fourths commute to downtown. If that relationship continues to hold true, another 35,000 commuters from the East Bay to downtown San Francisco and another 10,000 to other parts of the city will be added by 1990.

With the completion of BART a substantial increase in transit patronage may be expected. A net increase in transbay transit riders of 81 percent has been predicted by 1975 alone.

Table 20

TRANSBAY TRANSIT BETWEEN SAN FRANCISCO AND THE EAST BAY, BOTH DIRECTIONS, AVERAGE WEEKDAY ADULT TRIPS, 1965-1975

Transit Lines	1965	1975
AC Transit	33,541	3,640
Greyhound	8,054	--
BART	--	71,604
Total	41,595	75,244

Source: Northern California Transit Demonstration Project, Final Report, 1967.

A substantial part of the increase will be made up from diversion of vehicle riders to downtown employment to transit, with the remainder made up of new commuters, reverse commuters, and non-work trips for shopping, entertainment and recreation on both sides of the Bay. Almost 90 percent of total East Bay transit trips are expected to originate or terminate in downtown.

Table 21

DISTRIBUTION OF EAST BAY TRIPS TO AND FROM SAN FRANCISCO BART STATIONS, 1975

San Francisco Stations	Average Annual Weekday Person Trips	
Downtown:		
Montgomery Street	45,557	
Powell Street	13,585	
Civic Center	9,558	
Subtotal	68,700	88.3%
Other:		
16th Street	3,142	
24th Street	2,269	
Glen Park	1,280	
Balboa Park	1,490	
Daly City	1,019	
Subtotal	9,200	11.7%
Total	77,900*	100.0%

*Does not agree with total BART use on Table 20 because of different estimating procedures.

Source: Parsons-Brinckerhoff-Tudor-Bechtel "Rapid Transit System Passenger Traffic Assignment", June 6, 1966.

During the afternoon peak hour, peak direction travel between downtown San Francisco and the East Bay by BART is expected to reach 16,700 trips. An additional 800 trips are expected to be carried by AC Transit. On the assumption that the Bay Bridge has reached its limit in automobile capacity at approximately 12,000 person trips during the peak hour, unless auto occupancy rates increase, the modal split in 1975 will be 70 percent transit and 30 percent automobile. This new modal split in favor of transit is expected to result both from diversion of present auto users to transit and absorption of most increased peak period demand by transit.

BART is expected to divert persons to transit for non-work as well as commuter trips to downtown. Although non-work trips to downtown do not represent a majority of non-work trips to the city, when trips to North Beach are included, a majority of these trips are serviceable by BART and Muni. For trips to other parts of San Francisco, diversion of riders to BART will depend on transit connections within the city.

If the India Basin Bridge were built, it would bring new auto accessibility between the East Bay and San Francisco's South Bayshore district and would in addition divert approximately 50,000 vehicles a day from the Bay Bridge, improving accessibility for autos to downtown over the latter. The extent of the effect on BART patronage is difficult to estimate, but it can be assumed that potential transit ridership would be decreased during non-peak hours.

With the constantly growing interaction between the city and the East Bay, resulting from economic and social interchange, solution of transportation problems generated by commuters will have to include solutions to the problem of non-commuter travel. While BART will effectively provide for the line-haul and trip destinations in downtown, feeder bus service or other forms of connection to BART stops will have to improve in the East Bay.

Peninsula Corridor

Travel between the Peninsula and San Francisco is separated into two distinct movements by the San Bruno Mountains. The two suburban corridors are the coastside, from west of the mountains, and the Bayshore to the east. They are combined here because travel to downtown follows the same basic pattern. Three modes of travel are currently available: private auto, bus, and Southern Pacific Railroad. The two freeways, the Southern and the Bayshore, which presently merge before reaching downtown, are the basic link between the Peninsula and downtown. When the Southern Freeway is completed into the South of Market section of downtown, vehicular capacity between downtown and the Peninsula will be increased substantially.

Amount and Purpose of Travel. In 1965 about 57,500 trips were made to downtown from the Peninsula communities on a typical weekday for all purposes, just slightly more than were made by East Bay residents (Table 6). Over 40,000 of these trips were made for work, a number similar to that for the East Bay. However, less than 50 percent of Peninsula commuters work in downtown.[1]

[1]Appendix, Table C-3.

In 1965 approximately 90,500 persons resided on the Peninsula and worked in San Francisco. Commuting from the Peninsula to San Francisco has been increasing at a substantial rate despite growth of employment opportunities on the Peninsula itself.

Table 22

PENINSULA RESIDENTS EMPLOYED IN SAN FRANCISCO

Place of Residence	1960[a]	1965[b]	Percent Change
San Mateo	57,000	77,000	+ 35
Santa Clara	7,000	13,500	+ 93
Total Peninsula	64,000	90,500	+ 41

Sources: (a) U.S. Census of Population, 1960.

(b) Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

Non-work daily trips from the Peninsula to downtown amounted to over 17,000 in 1965, about 45 percent of all non-work trips from outside the city to downtown but less than 25 percent of all non-work trips from the Peninsula to the city as a whole.[1]

Both work and non-work trips to downtown from the Peninsula are smaller in proportion to total trips to the city than for other suburban corridors. Substantial numbers of Peninsula residents commute and make non-work trips to other parts of the city (see section on Non-Downtown Travel). A substantial number of trips is also generated between the city and San Francisco International Airport.

Modal Split. Sixty-seven percent of all trips to downtown from the Peninsula were made by automobile in 1965 (Table 7). Transit carried 38 percent of work trips to

[1]Appendix, Tables C-1 and C-3.

downtown, but only 21 percent of non-work trips were made by transit, less than for the East Bay. Most transit use is during the peak hours.

The potential of this corridor for public transit service to downtown has not been realized. The Southern Pacific rail service must share its trackage with freight service and, therefore, passenger operations are largely restricted to commuter periods. In addition, the peripheral location of the Third and Townsend railroad depot requires a long walk or a transit transfer to reach the downtown core.

The Greyhound bus lines offer a wider range of schedules and a broader distribution of Peninsula routes, but the attractiveness of this service is limited by vehicular traffic congestion on the freeways, limited off-peak service, and the location of the Seventh Street terminal. While that terminal serves the Civic Center and parts of South of Market, it is distant from the downtown core.

Peak-Period Travel. Over 28,000 trips were made by all modes to the Peninsula from downtown during the afternoon peak period in 1965, 49 percent of daily unidirectional trips (Table 11). Over 80 percent of these trips were from places of work.[1] During this period travel from downtown is equally split between automobiles and public transit, with slightly higher transit usage by Santa Clara residents and correspondingly higher automobile travel by San Mateo residents.

Table 23

PERSON TRIPS BY AUTO, TRUCK, AND TAXI
FROM DOWNTOWN TO THE PENINSULA, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	To Peninsula Counties		Total
	San Mateo	Santa Clara	
South of Market	6,801	441	7,242
North of Market	6,312	692	7,004
Total	13,113	1,133	14,246

Source: Bay Area Transportation Study Commission computer tabulations.

[1]Bay Area Transportation Study Commission computer tabulations.

Table 24

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE PENINSULA
4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	To Peninsula Counties San Mateo	Santa Clara	Total
South of Market	4,631	1,434	6,065
North of Market	6,729	1,483	8,212
Total	11,360	2,917	14,277

Source: Bay Area Transportation Study Commission.

Table 25

PERCENTAGE MODAL SPLIT, PERSON TRIPS
FROM DOWNTOWN TO THE PENINSULA
4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	San Mateo Auto	San Mateo Transit	Santa Clara Auto	Santa Clara Transit	Total Auto	Total Transit
South of Market	59%	41%	24%	76%	54%	46%
North of Market	48	52	32	68	46	54
Total	54%	46%	28%	72%	50%	50%

Source: Tables 23 and 24.

The tables indicate the higher proportion of persons using transit whose employment (or other trip origins) is north of Market Street and the higher proportion of Santa Clara residents using transit from all parts of downtown. The dominance of transit for the longer trips (to Santa Clara) corresponds to the similar relationship found in East Bay movement for Contra Costa residents and is a result of relatively fast service by Southern Pacific. The higher transit usage for persons originating north of Market Street is in contrast to the pattern for East Bay residents. Higher transit patronage is probably a result of the greater difficulty in reaching north of Market destinations by automobile from the south and in parking.

The Southern Pacific railroad carries almost 60 percent of all transit passengers during the afternoon peak hours.

Table 26

PERSON TRIPS BY TRANSIT LINES
FROM DOWNTOWN TO THE PENINSULA,
4 TO 6 P.M., WEEKDAY, 1965

Southern Pacific	8,336
Greyhound bus:	
Mission Street	3,465
James Lick Freeway	1,995
Potrero Avenue	735
Total	14,531*

*Minor discrepancy between total and total on Table 24 is result of different estimating procedures. See Appendix B.

Source: Downtown Parking and Traffic Survey, Cordon Count, 1965.

The higher proportion of transit use during the peak periods than for the entire day is a result of the comparative convenience and speed of travel, especially for rail commuters. During this period, the freeways and major arterials linking the city with the Peninsula are highly congested because of the combined demand from employees working in the southeastern section of the city, downtown employees living in the Mission-Bayshore Corridor, and Peninsula commuters.

Another result of the congestion during this period has been the development of circuitous routes of travel from the city to the Peninsula and use of local streets rather than the freeways.

Table 27

AUTO TRIPS CROSSING THE SAN FRANCISCO-SAN MATEO COUNTY LINE
(UNIDIRECTIONAL)

	Daily Flow*	Evening Peak Hour Southbound* (4:30 to 5:30)
Bayshore Corridor		
Bayshore Freeway	58,150	4,281
Bayshore Boulevard	13,123	1,800
Geneva Avenue	8,368	555
Total	79,641	6,636
(less through trips, e.g., no S.F. trip end)**	(11,530)	--
	68,111	
Coastside Corridor		
Mission Street	7,657	600
San Jose Avenue	9,135	1,151
Southern Freeway	18,917	2,959
Junipero Serra Boulevard	15,478	1,638
Lake Merced Boulevard	7,931	1,314
Skyline Boulevard	7,307	1,706
Total	58,494	9,368
(less through trips, e.g., no S.F. trip end)**	(1,130)	--
	57,364	
Total Peninsula	125,475	16,004

*Source: Adapted from San Francisco Department of Public Works Traffic Volumes maps 1966-1968.

**Source: Transbay Traffic Study

The foregoing indicates that 54 percent of the total daily unidirectional traffic between San Francisco and the Peninsula is found in the Bayshore corridor and 46 percent in the Coastside corridor. However, at peak hour the Coastside corridor carries 58 percent and the Bayshore corridor only 42 percent.

Congestion on the Bayshore Freeway and the greater hourly capacity of the Southern Freeway encourages diversion of travel to the Coastside corridor. In addition, some of the traffic generated in downtown is using the local street system to get to the Peninsula, primarily via Potrero Avenue.[1] It is not possible to separate out Peninsula and local traffic completely because travel between downtown (and the city in general) and the Peninsula is available by way of many vehicular connections. This also means that the potential for increased vehicular travel is higher, although freeway congestion would require diversion to the local street system during the peak periods.

Downtown generates substantial congestion during the afternoon peak period, because travel at this time represents half of all unidirectional travel between the Peninsula and downtown. However, travel generated by employment in the southeastern sections of the city is also a substantial cause of congestion during the peak hours. Because the effect of this travel, almost exclusively by automobile, is felt primarily in the Mission-Bayshore corridor, problems generated by it will be discussed in the next section.

Vehicular Traffic. As indicated on Table 27 above, less than 10 percent of travel in this corridor is through traffic with origins or destinations in the East or North Bay. Total traffic on the freeways and arterial routes is a composite of Peninsula and local travel. Differentiation between the routes of vehicular traffic according to the origins or destinations of trips is not possible. However, it can be assumed that, at least during the peak periods, the major arterials carry a larger proportion of traffic generated outside of downtown because trips to the Peninsula from other parts of the city are shorter. The exact extent to which traffic on the freeways and arterials is locally generated during off-peak hours is not known.

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[1]Comparison of Downtown Parking and Traffic Survey cordon counts and Bay Area Transportation Study Commission origin-destination data.

Future Trends. Commuting to San Francisco from the Peninsula will continue to change with the growth of employment opportunities on the Peninsula.

As of 1965, 34 percent of San Mateo workers were employed in San Francisco, a proportion second only to Marin County.[1] In contrast, 86 percent of Santa Clara employees worked in their own county, with 4 percent working in San Francisco.

Table 28

PROJECTED POPULATION AND EMPLOYMENT OF PENINSULA COUNTIES, 1990

County	1965	1990	% Change 1965-1990
San Mateo			
Population	559,500	872,500	56
Employment	173,300	362,800	109
Santa Clara			
Population	902,100	1,784,700	98
Employment	314,800	665,600	111
Two-County			
Population	1,461,600	2,657,200	82
Employment	488,100	1,028,400	111

All numbers rounded.

Source: Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

Employment in the two counties is expected to expand at a rate almost 30 percent higher than population by 1990. The combined rate, however, does not indicate the significance of differences between rates of growth for employment and population between the two counties, each of which has widely disparate commuter relationships with San Francisco. Employment

[1]Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

in San Mateo is expected to grow at twice the rate of population between 1965 and 1990, whereas Santa Clara's population will grow at a rate similar to that for employment opportunities. According to projections of resident labor force, as well as of population and employment, it appears that the absolute increase in employment opportunities in San Mateo will be almost matched by growth in Santa Clara's labor force in excess of its employment.[1] Because Bay Area residents in general, and Santa Clara residents in particular, appear to have a tendency to find employment near place of residence, it may be expected that most of the increased Santa Clara labor force will find work in San Mateo. The net effect should be for a slight increase in commuting from Santa Clara to San Francisco, resulting primarily from increased mobility and choice among employment opportunities.

Although growth of employment in San Mateo might well suggest a substantial decrease of commuting from that county to the city, in actuality, past trends do not suggest that this will occur. Although employment in the county increased substantially between 1960 and 1965, commuting to San Francisco went up by 35 percent. While projections of labor force and employment in San Mateo indicate a major decrease in net outcommuting, the expected decrease is located primarily south of the city of San Mateo.[2] Due to this fact and to the proximity of northern San Mateo residents to San Francisco, some increases in commuting to San Francisco may be expected. It is not possible to estimate the actual increase, but trends in this and other regions suggest that the total amount of commuting tends to increase with growth in employment opportunities distributed throughout the region. Within this context the county line cannot be seen as anything but an artificial barrier to job or residence location. The proportion of San Mateo residents working in their own county would have to increase by at least half before commuting to San Francisco could be expected to decrease.

Once the Southern Freeway is completed into downtown, increased traffic volumes on this highway down the coastside corridor will occur. This will likely reduce congestion somewhat on the Bayshore Freeway and perhaps lead to a decline in transit patronage for residents on the coastside of the

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[1]Bay Area Transportation Study Commission, Bay Area Transportation Report, p. 45.

[2]Ibid.

Peninsula. Some future relief and additional transit patronage may be expected from the BART Daly City station. However, this facility will be most attractive to northern coastside communities. If the India Basin Bridge is built, some of the through traffic between the East Bay and the Peninsula will be diverted from the Bayshore Freeway.

BART will provide additional transit service for non-work trips between northern San Mateo County and downtown. However, since most of the Peninsula non-work travel is to other areas in the city, BART is not likely to divert substantial amounts of persons from automobile use. Heavy daily traffic will continue, especially on the two freeways. It will be compounded by airport-generated travel.

Travel between San Francisco and the Airport. Because the San Francisco International Airport is a substantial generator and attractor of trips, a special problem of land transportation is presented by its Peninsula location. Airport passenger volume has been estimated to increase from the 1967 level of 12 million to 24 million by 1975.[1] Since severe congestion already exists on the Bayshore Freeway, which is the only major means of access between the airport and San Francisco, the problems caused by future growth require immediate attention.

Travel patterns identified in 1967 indicate that 36 percent of all air passengers were destined for San Francisco, and more than half of these for downtown. Twenty-five percent of all travel generated by the airport, including employees, was destined for the city. An additional 14 percent of travel bound for non-San Francisco destinations passed through the city.

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[1]Wilbur Smith Associates, Traffic Study: San Francisco International Airport, 1967.

Table 29

DESTINATIONS OF PERSONS LEAVING SAN FRANCISCO INTERNATIONAL AIRPORT, AVERAGE WEEKDAY, 1967

Purpose at Airport	DESTINATIONS Downtown S.F.	Other S.F.	Total S.F.	Elsewhere	Total	Percent to S.F.
Air Passengers	4,260	3,470	7,730	13,820	21,550	36%
Business & Social; Passenger Service	1,810	3,590	5,400	16,800	22,200	24%
Employees	620	2,330	2,950	16,650	19,600	15%
Other	340	510	850	2,680	3,530	24%
Total	7,030	9,900	16,930	49,960*	66,880	25%
Percent	10.5%	14.8%	25.3%	74.7%	100%	
Number of Total by Airporter Bus	2,210	660	2,870	170	3,040	
Percent of Total by Bus	31%	7%	17%	7%	12%	

*Additional trips passing through San Francisco: 9,700 (14.5%).

All numbers rounded.

Source: Wilbur Smith Associates, Traffic Study: San Francisco International Airport, 1967, p. 30.

The table indicates that the Airporter bus carried only 17 percent of all travel destined for San Francisco and 31 percent of travel to downtown. Taxis, hotel limousines and Greyhound bus carry another 15 percent of all travelers to downtown.

Fortunately, the distribution of air passenger trips from the airport is much more even throughout the day than is the case of urban travel in general. At present this prevents congestion from being heightened on the Bayshore Freeway and may work to the advantage of transit in the future by providing

patronage at times when service is not in demand for work trips and capacity is high.

The periods of highest demand for ground transportation by air passengers occurs during the daytime hours between commuter peaks and in the early evening after peak commuter demands. The periods of lowest air passenger demands coincide with the times when other trip demands from the airport, mainly employees, is highest, thus easing the maximum capacity which might be needed.

Table 30

TIMES OF PERSONS LEAVING SAN FRANCISCO INTERNATIONAL AIRPORT, 1967, WEEKDAYS

Time	Air Passengers		All Departures	
	Number	Percent	Number	Percent
Midnight to 8 a.m.	1,755	8.5%	8,196	12.5%
8 to 10 a.m.	1,680	8.2	5,044	7.7
10 a.m. to 12 noon	2,271	11.1	5,864	9.0
12 to 2 p.m.	2,279	11.1	6,458	9.9
2 to 4 p.m.	2,547	12.4	8,161	12.5
4 to 6 p.m.	1,989	9.7	11,173	17.1
6 to 8 p.m.	3,337	16.3	6,570	10.0
8 to 10 p.m.	3,150	15.4	7,024	10.7
10 p.m. to midnight	1,496	7.3	6,917	10.6
Total	20,504	100.0%	65,407	100.0%

Source: Wilbur Smith Associates, Traffic Study: San Francisco International Airport, 1967, p. 40.

If the existing modal split continues, the number of vehicles leaving the airport daily will almost double by 1975 from 1967 levels.

Table 31

PROJECTED AIR PASSENGER AND VEHICULAR TRAFFIC
AT SAN FRANCISCO INTERNATIONAL AIRPORT, 1967-1975

	1967	1971	1975
Air Passengers (annual)	12,000,000	18,000,000	24,000,000
Total Airport Vehicular Exits (daily)	42,000	65,000	80,000
Peak-hour Vehicular Exits	6,000	9,000	11,500
Outbound Person Trips by Public Transportation (daily)*	8,000	11,700	15,300
Percent by Public Transportation	19.0%	18.0%	19.1%

*Includes future bus, helicopter, taxi and hotel limousine but assumes no improved transit service such as BART which would change the modal split.

Source: Wilbur Smith Associates, Traffic Study: San Francisco International Airport, 1967, pages 59 and 62.

The minimal parking requirements projected to satisfy vehicular needs for the three target years are as follows:

1967	1971	1975
12,000 spaces	19,500 spaces	25,000 spaces

In addition to this extensive parking demand, massive additions would be needed in the highway network to accommodate this increased vehicular demand. The possibility of providing rapid transit between downtown San Francisco and the airport is now being explored.

Mission-Bayshore Corridor

The Mission-Bayshore corridor is defined by the downtown on the north, the Bay on the east, the county line on the south, and the hills separating it from Twin Peaks, Sunset and Lake Merced on the west. In order to make the best use of available data, it has been necessary to combine what are really two corridors -- the Bayshore and the Mission. However, since travel patterns to downtown are similar, they may reasonably be considered together.

The Bayshore section of the corridor comprises most of San Francisco's industrial activities. As a result this section of the corridor is a prime traffic attractor and correspondingly less of a generator of traffic to downtown employment.

The Mission side is predominantly residential with significant employment in the Inner Mission. Higher residential densities are found closer to downtown and lower-density development in the Outer Mission area and on hilltop sites, as in Bernal Heights.

Mission and Third Streets are strips of major commercial development. Due to physical barriers, movement is primarily in a north-south direction. The South Bayshore and Outer Mission are not directly linked to downtown because of intervening topographic barriers. Movement from these areas is forced into a few channels.

In 1960 the corridor had a population of 229,100 in 77,698 households.[1] Although there has been an increase of 5,746 housing units since 1960,[2] this does not indicate that the population of the area has increased. Recent preliminary 1970 census estimates show that, despite an increase in housing units of over 20,000, the population of the city has declined by 36,000. The only reasonable conclusion is that smaller household sizes now exist, resulting from an increase in the number of single and two-person households. Except where large numbers of elderly persons are living, this would generally suggest a small increase in the labor force and generation of more work trips.

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[1]U.S. Bureau of the Census, Census of Population, 1960.

[2]San Francisco Department of City Planning, Changes in the San Francisco Housing Inventory, 1969, April, 1970.

MISSION-BAYSHORE CORRIDOR

SAN FRANCISCO BAY

Mission Rock Terminal

Bethlehem Shipyard

Army Street Terminal

San Francisco Naval Shipyard

Candlestick Park

San Francisco Produce Market

San Francisco General Hospital

John McLaren Park

Cow Palace

San Francisco City College

Mission Shopping Area

St. Luke's Hospital

Howard St.

Duboce Ave.

Sixteenth St.

Eighteenth St.

Army St.

Bay Shore Blvd.

Southern Freeway

Third St.

Potrero Ave.

Guerrero St.

Dolores St.

Valencia St.

Mission St.

San Jose Ave.

Van Ness Ave.

Folsom St.

Harrison St.

Oakdale Ave.

Industrial St.

Silver Ave.

James Lick Freeway

Evans Ave.

Palou Ave.

Innes Ave.

Monterey Blvd.

Ocean Ave.

Geneva Ave.

Mansell St.

Diamond Heights Blvd.

Clarendon Ave.

Portola Dr.

Miraloma Blvd.

Beaumont Ave.

Bosworth St.

POTRERO HILL

INNER MISSION

PERALTA HEIGHTS

ISLAIS CREEK

BERNAL HEIGHTS

APPAREL CITY

CRESCENT

FAIRMOUNT

HOLLY PARK

GLEN PARK

DIAMOND HEIGHTS

MIRALOMA PARK

SHERWOOD HEIGHTS

SERWOOD OREST

ST. MARY'S PARK

SILVER TERRACE

HUNTERS POINT

WESTWOOD HIGHLANDS

SUNNYSIDE

WESTWOOD PARK

MISSION TERRACE

UNIVERSITY MOUND

PORTOLA

BAYVIEW

INGLESIDE

SAN MIGUEL

CAYUGA

EXCELSIOR

REIS-PAUL

BRET HARTE

OCEAN VIEW

CROCKER-AMAZON

SUNNYDALE

VISITACION VALLEY

CANDLESTICK COVE

* *Major Trip Generators*

• BART Subway Station

Amount and Purpose of Travel. In 1965, this corridor generated an estimated 64,300 trips to downtown for all purposes, the highest number of any corridor (Table 6). Of these trips, 38,700 (60 percent) were made for work, more than any other city corridor and slightly less than for the East Bay and Peninsula corridors. The large number of trips generated by this corridor in relation to other city corridors is a reflection in part of its higher population. In addition, the ratio of downtown work trips to total households is 0.50, just higher than the average for all corridors and second only to the Marina corridor (Table 9). Although the corridor generates more non-work trips than any other corridor, its ratio of non-work trips to households is the second lowest in the city.

Because the freeway links to the Peninsula pass through this city corridor, many of the transportation facilities serve both the Peninsula and Mission-Bayshore corridors. When both are combined, travel in this direction to downtown constitutes about one-third of all travel to downtown.

Modal Split. Fifty-eight percent of all trips to downtown from this corridor were made by automobile in 1965, the highest ratio of automobile usage of any city corridor (Table 7).

For work trips, transit usage was higher at 46 percent; however, this is the only city corridor where transit did not dominate for work trips to downtown. Sixty-three percent of all non-work trips to downtown were made by automobile.

Low transit patronage for downtown work trips is consistent with overall low transit usage by workers in this corridor. In 1960, the modal split for all work trips originating in the corridor was 59 percent auto and 41 percent transit.[1] This pattern of low transit usage for work trips indicates the lack of adequate public transit facilities.

Of the different sections in this corridor the South Bayshore has the lowest transit patronage for travel to downtown. Virtually all transit linking downtown and the Bayshore section of the corridor is by way of two local bus routes along Third Street. Because this arterial is not located in proximity to large numbers of homes and is heavily traveled, transit service is not convenient.

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[1]U.S. Bureau of the Census, Census of Population, 1960.

Table 32

DAILY TRAVEL TO DOWNTOWN FROM THE MISSION-BAYSHORE CORRIDOR, PERCENTAGE MODAL SPLIT BY ZONE

District (Zone)	Work Trips Auto	Work Trips Transit	Non-Work Trips Auto	Non-Work Trips Transit	Total Trips Auto	Total Trips Transit
Mission-Potrero (Zone 7)	48%	52%	59%	41%	52%	48%
South Bayshore (Zone 9)	65	35	79	21	71	29
Outer Mission (Zone 10)	53	47	55	45	54	46
Total	54%	46%	63%	37%	58%	42%

Source: Table 6.

Transit use is highest in the Mission-Potrero area. Transit service between Potrero Hill and downtown has been poor in the past, although the recent addition of one direct bus route has improved service. Because transit service is relatively much better for the Inner Mission than for Potrero Hill, it can be assumed that transit patronage is much higher and that a higher proportion of automobile use for downtown work trips is generated in Potrero Hill.

More residents of the Inner and Outer Mission are within walking distance of transit lines destined for downtown. The Inner Mission is served by several downtown-connecting bus routes. The Outer Mission has circuitous but no-transfer service on the "K"-Ingleside and "M"-Ocean View streetcar lines. Bus service is also available, including express routes along the major arterials -- San Jose-Mission Street and Alemany to the Bayshore Freeway.

Table 33

MEANS OF TRAVEL TO AND FROM MUNI VEHICLES FOR TRAVEL BETWEEN THE MISSION-BAYSHORE CORRIDOR AND DOWNTOWN, BOTH DIRECTIONS, WEEKDAY, 1965

	Inner & Outer Mission*	%	Potrero*	%	Bayshore*	%	Total Corridor	%
Mode of Connection:								
Transit	8,960	31%	3,376	44%	3,424	51%	15,760	37%
Auto	1,310	5	404	5	378	6	2,092	5
Walk	18,476	64	3,942	51	2,836	43	25,254	58
Total	28,746	100%	7,722	100%	6,638	100%	43,106	100%

*NCTDP transit zones, Appendix B.

Source: Northern California Transit Demonstration Project, Final Report, p. 35, Table 7.

Forty-two percent of transit passengers traveling to downtown from the corridor must transfer or use an automobile to reach transit as compared with less than 33 percent for the city as a whole. As is to be expected, the highest proportion of transfers and auto connections is found in the Bayshore section. The necessity for transfers and changes of mode are well-known obstacles to higher transit patronage. Automobile usage would probably be even higher, but for the existence of a substantial low-income population who rely on public transportation for access to employment. During peak hours, transit use is higher although the patterns of use among the districts of the corridor are about the same.

Peak-Period Travel. Total person trips from downtown to this corridor during a typical afternoon peak period ranged between 27,000 and 29,000 by all modes in 1965.[1] This was the highest number of peak-period trips generated by a city

[1]Bay Area Transportation Study Commission computer tabulations and Downtown Parking and Traffic Survey cordon count.

corridor, a reflection of both the high total number of trips between the corridor and downtown and the high proportion of work trips to total trips. However, afternoon peak-period travel represented only 42 percent of 24-hour unidirectional travel between downtown and the corridor, a lower proportion than every corridor except Richmond-Western Addition. This suggests that, since vehicular traffic must compete with that generated by the Peninsula corridor, congestion during peak hours for the combined southerly movement is causing avoidance of peak hours, especially for non-work trips.

Transit accounted for 52 percent of peak-period trips, substantially more than for total daily trips but much lower than for other city corridors during the same period (Table 10).

Table 34

PERSON TRIPS BY AUTO, TRUCK AND TAXI FROM DOWNTOWN TO THE MISSION-BAYSHORE CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	To Mission-Bayshore Zones			
	Mission-Potrero	South Bayshore	Outer Mission	Total
South of Market	2,845	1,569	1,188	5,602
North of Market	2,468	2,854	2,146	7,468
Total	5,313	4,423	3,334	13,070

Source: Bay Area Transportation Study Commission computer tabulations.

Table 35

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE MISSION-BAYSHORE CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	To Mission-Bayshore Zones			
	Mission-Potrero	South Bayshore	Outer Mission	Total
South of Market	2,216	285	1,835	4,336
North of Market	4,480	1,506	3,874	9,860
Total	6,696	1,791	5,709	14,196

Source: Bay Area Transportation Study Commission computer tapes.

Table 36

PERCENTAGE MODAL SPLIT, PERSON TRIPS FROM DOWNTOWN TO THE MISSION-BAYSHORE CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	To Mission-Bayshore Zones: Mission-Potrero Auto	Mission-Potrero Transit	South Bayshore Auto	South Bayshore Transit	Outer Mission Auto	Outer Mission Transit	Total Auto	Total Transit
South of Market	56%	44%	85%	15%	39%	61%	56%	44%
North of Market	36	64	65	35	36	64	43	57
Total	44%	56%	71%	29%	37%	63%	48%	52%

Source: Tables 34 and 35.

The modal split during the afternoon peak period is consistent with that for the entire day and with the nature of transit service already explained. The most significant indication is the very low transit patronage of the South Bayshore area, equivalent to the transit ratio for all daily trips to downtown, which is very unusual. The Outer Mission area has substantially higher transit use during peak hours than during the entire day, no doubt a reaction to the very high congestion on the freeways and major arterials through the corridor. Outer Mission residents with access to the streetcar lines are able to avoid some of the effect of automobile congestion.

Overall higher transit use for North of Market origins follows from the more congested traffic and parking situation in that portion of downtown.

Vehicular Traffic. Most automobile travel and transit share the same major arterials between downtown and destinations within the Mission-Bayshore corridor (with the exception of streetcar riders on the "K" and "M" lines). Third Street, as the only direct arterial between downtown and the South Bayshore, is presumed to carry most of the auto and transit travel to that area. It is severely congested during the afternoon rush hours, being shared by buses, automobiles, and trucks servicing the port and industry along the southern waterfront.

Table 37

ROUTING OF PEAK PERIOD AUTOMOBILE AND TRANSIT PERSON TRIPS EXITING FROM DOWNTOWN TO THE MISSION-BAYSHORE CORRIDOR 4 TO 6 P.M., WEEKDAY, 1965

Streets[a]	Person Trips by Auto, Truck & Taxi	Transit
McCoppin	-- [b]	484[c]
Mission	2,002	4,986
South Van Ness	3,915	534
Folsom	2,012	--
Harrison	2,344	137
Bryant	739	1,909
Eighth	944	--
Sixth	497	--
Fifth	558	--
Berry	109	--
Fourth	449	--
Third	3,831	1,779
James Lick Freeway	-- [d]	2,507[e]
Total[f]	17,400	12,336[f]

(a) Potrero Avenue auto travel assigned to Peninsula destinations.
(b) McCoppin auto travel assigned to Twin Peaks-Sunset destinations.
(c) Valencia bus.
(d) Freeway auto travel assigned to Peninsula destinations.
(e) Muni express routes, excluding 562 trips assigned to Lake Merced.
(f) Cordon count total does not identify streetcar riders with Ocean View-Ingleside destinations and probably includes auto travel originating outside BATSC zones 1 and 2 in the Van Ness corridor.

Source: Downtown Parking and Traffic Survey, Cordon Count, 1965.

Most traffic bound for the Mission district leaves downtown on Mission, South Van Ness, Folsom, and Harrison in South of Market. It spreads on to other parallel streets in the Mission. Although most express buses and some autos use the Bayshore and Southern Freeways to reach Outer Mission

destinations, most autos choose local routes, since the freeways are heavily congested with suburban traffic.

Table 38

VEHICULAR TRAFFIC IN THE MISSION DISTRICT, 4:30 TO 5:30 P.M., OUTBOUND, SOUTH OF 14TH STREET, NORTH OF ARMY STREET

Streets	1961-64	1966-68
Guerrero	1,088	1,202
Valencia	680	952
Mission	711	616
South Van Ness	1,465	1,457
Folsom	885	925
Potrero	1,437	1,477
Subtotal	6,266	6,629
Dolores	NA	853
Bryant	NA	75
Harrison	NA	620
Total	NA	8,107

NA = not available.

Source: Department of Public Works, Traffic Flow Maps.

Average evening peak outbound vehicular traffic through the Mission district has been increasing at a rate of about 1.6 percent per year, with three streets carrying most of the traffic.

Twenty-four hour traffic through the same district shows approximately the same rate of increase, and a more even distribution of traffic along the available routes.

Table 39

VEHICULAR TRAFFIC IN THE MISSION DISTRICT,
24 HOURS, BOTH DIRECTIONS,
SOUTH OF 14TH STREET, NORTH OF ARMY STREET

Streets	1963-65	1966-68
Dolores	7,600	10,242
Guerrero	14,131	15,930
Valencia	15,379	17,303
Mission	16,656	13,737
South Van Ness	18,551	19,905
Folsom	9,372	8,709
Potrero	18,732	19,259
Total	100,421	105,085

Source: Department of Public Works, Traffic Flow Maps.

These streets through the Mission district are carrying traffic destined for and originated in both the Outer and Inner Mission areas. Recent trends indicate that less and less of the traffic is through to the Outer Mission. The following tables show a slight decrease of peak-hour traffic on the two major arterials leading south of Army Street into the Outer Mission and southwestern portion of the city; a correspondingly larger decrease is indicated for 24-hour traffic on these routes. In contrast to the situation south of Army Street, increases are shown in the Mission district proper for both the evening peak hour and for the twenty-four hour period. Thus, the traffic increase in the Mission district seems to be local to the area and not a function of increased through traffic. Comparison of the three-year 12.5 percent decrease for twenty-four hour traffic on arterials south of Army with the three-year 52.7 percent increase (from 50,300 to 76,800 vehicles) for the Southern Freeway between the James Lick Freeway and San Jose interchanges indicates clearly the diversion of through traffic onto the freeways during the non-peak hours.

Table 40

VEHICULAR TRAFFIC IN THE OUTER MISSION,
4:30 TO 5:30 P.M., OUTBOUND,
SOUTH OF ARMY STREET

Streets	1961-64	1966-68	Change	%/Year
San Jose	2,586[a]	2,606[b]	+20	--
Mission	1,509[c]	1,293[d]	-216	--
Total	4,095	3,899	-196	-1.4%

(a) Total of southbound San Jose and Dolores traffic.
(b) Count taken south of Dolores intersection, and from 1964-66 map.
(c) Total of southbound Mission and half of westbound Cortland traffic.
(d) Count taken south of Cortland intersection.

Source: Department of Public Works, Traffic Flow Maps.

Table 41

VEHICULAR TRAFFIC IN THE OUTER MISSION,
24 HOURS, BOTH DIRECTIONS,
SOUTH OF ARMY STREET

Streets	1963-65	1966-68	Change	%/Year
San Jose	28,409	24,100	-4,309	--
Mission	22,339	20,277	-1,952	--
Total	50,748	44,377	-6,371	-4.2%

Source: Department of Public Works, Traffic Flow Maps.

During the peak hours, however, through traffic continues to account for much of the heavy usage of streets in the Mission. Because of the flat land and relatively wide streets, the Mission neighborhoods suffer more than most in the city from heavy vehicular traffic. Except for Mission and Valencia Streets, which are bordered predominantly by commercial and

industrial uses, all of the other arterials are residential streets.

Future Trends. It is not possible to predict the future level of trips to downtown by residents in this corridor but downtown work and non-work trips originating in this corridor should be expected to increase as a result of new development.

A substantial amount of the city's limited supply of vacant, undeveloped land is in this corridor, especially in the South Bayshore district. In addition, the Diamond Heights redevelopment project, involving a future addition of 1,700 housing units, is under way. Implementation of the South Bayshore Plan, as approved by the City Planning Commission, in connection with new housing provided under the Model Cities Program can be expected to provide for additional households in that area, thus increasing transportation demand, some of which will be for downtown employment locations and downtown shopping. In addition, as incomes rise in this portion of the corridor following improved economic conditions, higher automobile ownership and, therefore, higher automobile usage will result, unless transit is substantially improved.

For the western half of this corridor, public transit service will be considerably improved with the completion of BART. A corresponding realignment of bus lines to improve access to BART stations could improve transit service for eastern sections of the corridor. The completion of BART itself may be expected to lead to an increase in residential development near BART stations in the Mission and the southwestern part of the city.

The number of daily BART trips between downtown and the five stations in this corridor is expected to reach 43,500 by 1975, more than one and one-half times average 1965 transit trips for the Mission side of the corridor.

Table 42

PROJECTED AVERAGE WEEKDAY PERSON TRIPS ON BART BETWEEN DOWNTOWN AND THE MISSION, BOTH DIRECTIONS, 1975

Downtown Stations	
Civic Center	8,810
Powell Street	16,150
Montgomery Street	18,540
Total	43,500

Source: Parsons-Brinckerhoff-Tudor-Bechtel, "Rapid Transit System Passenger Traffic Assignment", June 6, 1966.

Despite the addition of BART and the Southern Freeway, congestion will continue for peak-hour travel between downtown, this corridor, and the Peninsula corridor. With BART terminating in Daly City, its use by Peninsula residents for downtown travel will be minimal. Continued and increasingly heavy use of the freeways by suburban commuters from the Peninsula will occur. The Southern Freeway will offer little relief for peak-period Peninsula commuters as both downtown parking capacity and the Bayshore and Southern Freeway surface arterial connections in downtown are limiting factors. With the Peninsula inadequately served by transit, and existing bus systems unable or unwilling to accommodate substantially increased demand, the likely result could be for increasing use of local arterials by suburbanites during peak hours. Increasing use of transit by city residents may remove autos from the streets only to be replaced by suburban commuter traffic. Since many of these streets are residential in character, this is a serious problem both at present and for the future. It is a problem, however, that will not have a local cause, once BART is completed. Solutions will have to be found with respect to commuters from outside the city.

Twin Peaks-Sunset Corridor

The Twin Peaks-Sunset corridor encompasses the southwest quadrant of the city, the Sunset, Ingleside, most of the hilly central area, Buena Vista, and western sections of the Mission district. Although the areas on each side of the central hill belt are quite different, access to downtown is by the same direction.

TWIN PEAKS - SUNSET CORRIDOR

* *Major Trip Generators*

• New Muni Subway Stations

The overall land use in this corridor is primarily residential, with the Sunset and Twin Peaks areas consisting of low-density, single-family homes. Higher density housing is found in the neighborhoods closer to downtown.

Major institutional uses, which are high traffic generators, are located in this corridor: the University of California Medical Center at Mount Sutro, San Francisco State College near Lake Merced, and Laguna Honda Hospital in Forest Hill. The Stonestown Shopping Center, a regional shopping area, is near Lake Merced. The beach, the zoo and Lake Merced itself attract many people during weekdays and weekends.

The topography of the corridor has played an important role in the development of transportation facilities and still constrains alternatives. The hilly central portion forms a major barrier to travel and only a few routes are available through it. The routes through the hills from the west are Portola Drive and Dewey Boulevard-Clarendon. Major routes to downtown which circumscribe the hills are Lincoln Way to Kezar Drive through Golden Gate Park north of Mount Sutro and streets south of Mount Davidson, such as Ocean Avenue, Monterey Boulevard and Brotherhood Way which lead into Alemany Boulevard, San Jose Avenue and the Southern Freeway. The street system in the neighborhoods east of the hills relate to the pattern of the streets in the adjacent Mission-Bayshore and Richmond-Western Addition corridors. Traffic has a fairly wide choice of streets for access to downtown, which include Seventeenth Street, Oak, Haight and Duboce Streets, Dolores, and Market Street, into which all of the others feed.

The population of the corridor in 1960 was 205,000 in 77,245 households. Since 1960, 6,074 housing units have been added, the highest absolute net increase in the city.[1] The increase in households suggests a rise in the size of the working population.

Amount and Purpose of Travel. In 1965 this corridor generated 58,100 trips to downtown on a typical weekday for all purposes, the second highest of all corridors (Table 6). Fifty-eight percent of all trips were for work, also the highest proportion in the city. The large number of trips generated are a result, as in the case of the Mission-Bayshore corridor, of the large population of this corridor. However,

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[1]San Francisco Department of City Planning, Changes in the Housing Inventory, 1969, April, 1970.

the ratio of downtown work and non-work trips to number of households is lower than for any other city corridor (Table 9). This suggests several causative factors: less downtown employment as proportion of all employment, lower overall employment due to the presence of elderly retired persons, and the lesser attraction of downtown for shopping and other non-work travel due to the distance of much of the corridor from downtown. Half of total travel originates in the two sections of the corridor which are closer to downtown (Table 6).

Modal Split. The Twin Peaks-Sunset corridor has the highest transit usage for downtown work trips of any corridor, with a modal split of 58 percent transit, 42 percent automobile. Transit is used for 43 percent of non-work trips to downtown, second only to the Richmond-Western Addition corridor. For all trips on a typical weekday, transit accounts for 49 percent, the highest overall modal split in favor of transit of all corridors (Table 7).

Table 43

DAILY TRAVEL TO DOWNTOWN FROM THE TWIN PEAKS-SUNSET CORRIDOR, PERCENTAGE MODAL SPLIT BY ZONE

District (Zone)	Work Trips		Non-work Trips		Total Trips	
	Auto	Transit	Auto	Transit	Auto	Transit
Buena Vista (Zone 5b)	50%	50%	59%	41%	54%	46%
Twin Peaks, Upper Market, West Mission (Zone 8)	41	59	57	43	48	52
Inner Sunset (Zone 11)	51	49	54	46	52	48
Outer Sunset (Zone 12)	46	54	51	49	48	52
Lake Merced (Zone 13)	41	59	62	38	51	49
Total	46%	54%	57%	43%	51%	49%

Source: Table 6.

High transit patronage is indicative of the quality of service in this corridor for downtown movements, the best in the city. All five streetcar lines partly or wholly serve the corridor. The "N" Judah and "L" Taraval, the two busiest lines, are completely within this corridor, as is the "J" Church, and substantial portions of the "K" Ingleside, and "M" Ocean View lines.

The Muni also provides bus service in this corridor, both express and local lines, to downtown. One express route links the Lake Merced area to downtown via the Bayshore Freeway; another serves the portion of Sunset between Taraval and Judah for downtown travel. A local route crosses north-south on Sunset Boulevard and thence to downtown. Another local runs along 19th Avenue, linking the east-west streetcar lines. Only one bus provides direct travel from the Inner Sunset area to downtown, but feeder buses are available to streetcar lines. Frequent bus service along Haight and Market Streets serves the northern and eastern sections of the corridor.

Use of transit is high even for non-work trips to downtown, especially for the Outer Sunset, presumably because of the continuous service afforded by the streetcar lines. As would be expected, transit use for non-work trips by Lake Merced residents is lowest because of the time required to move by surface transit from this outlying area to downtown, whereas the Mission-Bayshore corridor freeways and Portola-Market are not highly congested during off-peak hours. Rugged topography, impeding bus access and making walking to and from transit difficult, may explain in part the relatively high use of automobile travel in some of the Buena Vista area. Another factor is the minimal loss in time caused by congestion for an area so close to downtown.

The overall high use of transit for downtown travel in this corridor is in sharp contrast to that in the Mission-Bayshore corridor. The difference is even more remarkable when consideration is given to the generally higher incomes of residents in this corridor, since high-income residents usually have a higher rate of automobile use. The primary explanation is the high level of service provided. This is indicated by the fact that two-thirds of transit passengers have downtown trunk-line service available within walking distance of their homes.

The area west of Twin Peaks (Inner Sunset and Laguna Honda), as would be expected, has the lowest direct service connections, with twice the proportion of Muni riders requiring automobiles to reach transit and more requiring a transit transfer to reach downtown.

Table 44

MEANS OF TRAVEL TO AND FROM MUNI VEHICLES FOR TRAVEL BETWEEN THE TWIN PEAKS-SUNSET CORRIDOR AND DOWNTOWN, BOTH DIRECTIONS, WEEKDAY, 1965

Mode of Connection	Buena Vista*	%	Sunset*	%	West of Twin Peaks*	%	Total for Corridor	%
Transit	3,923	23	6,070	25	3,842	34	13,844	26
Auto	854	5	1,382	5	1,270	11	3,506	7
Walk	12,374	72	17,030	70	6,148	55	35,552	67
Total	17,160	100	24,482	100	11,260	100	52,902	100

*NCTDP transit zones, Appendix 5.

Source: Northern California Transit Demonstration Project, Final Report, p. 35, Table 7.

Peak-Period Travel. A total of 27,100 person trips by all modes were recorded during the afternoon peak period between downtown and this corridor in 1965, just slightly less than to the Mission-Bayshore corridor. Travel during this peak period represented 47 percent of all unidirectional travel between downtown and the corridor (Table 11), causing heavy congestion on streets and use of streetcar lines to full capacity. The concentration of more than one-half of all unidirectional transit travel (58 percent) in the evening peak period requires capacity far in excess of current non-peak hour demand. The new rolling stock and subway will allow for increased capacity and shorter travel time, especially during peak periods.

Transit accounted for 61 percent of total afternoon peak-period person trips in 1965, the highest proportion in any corridor. This is consistent with the high use of transit throughout the 24-hour period. The percentage modal split during the peak period varies substantially for different parts of this large corridor and for varying downtown locations.

Auto use is predominant for employment destinations south of Market Street, primarily because of auto use by Sunset and Lake Merced area residents. Due to the length of the trip many of these residents probably find it more convenient to use arterials and the freeways through the Mission-Bayshore corridor than to use transit. The Market Street-Portola route with its left-turn restrictions strongly favors inbound traffic

Table 45

PERSON TRIPS BY AUTO, TRUCK AND TAXI FROM DOWNTOWN TO THE TWIN PEAKS-SUNSET CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Twin Peaks-Sunset Zones: Buena Vista	Twin Peaks-Upper Market	Inner Sunset	Outer Sunset	Lake Merced	Total
South of Market	1,412	746	788	1,952	598	5,496
North of Market	1,579	620	448	949	1,409	5,005
Total	2,991	1,366	1,236	2,901	2,007	10,501

Source: Bay Area Transportation Study Commission computer tabulations.

Table 46

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE TWIN PEAKS-SUNSET CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Twin Peaks-Sunset Zones: Buena Vista	Twin Peaks-Upper Market	Inner Sunset	Outer Sunset	Lake Merced	Total
South of Market	909	1,111	448	2,293	453	5,294
North of Market	2,708	4,549	1,112	2,802	1,332	11,392
Total	3,617	4,549	1,560	5,095	1,785	16,606

Source: Bay Area Transportation Study Commission computer tabulations.

Table 47

PERCENTAGE MODAL SPLIT, PERSON TRIPS FROM DOWNTOWN TO THE TWIN PEAKS-SUNSET CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	To Twin Peaks - Sunset Zones											
	Buena Vista		Twin Peaks-Upper Market		Inner Sunset		Outer Sunset		Lake Merced		Total	
	Auto	Transit	Auto	Transit	Auto	Transit	Auto	Transit	Auto	Transit	Auto	Transit
South of Market	61%	39%	40%	60%	64%	36%	46%	54%	57%	43%	51%	49%
North of Market	37	63	15	85	29	71	25	75	51	49	33	67
Total	45%	55%	21%	79%	44%	56%	36%	64%	53%	47%	39%	61%

Sources: Tables 45 and 46.

destined for South of Market. In addition, the parking problem south of Market Street is less severe than to the north.

For North of Market destinations, transit is very highly favored. Only residents of the far southwestern part of the city use automobiles to a greater extent than transit. Heaviest use of transit originates in the Upper Market, Twin Peaks, and western Mission areas.

Vehicular Traffic. While almost all[1] transit trips leave downtown during the afternoon peak period via Market Street (with branching off thereafter on Haight, Duboce, Church, and others), automobile traffic exits from downtown on several routes.

Table 48

ROUTING OF PERSON TRIPS BY AUTO AND TRUCK, EXITING FROM DOWNTOWN TO TWIN PEAKS-SUNSET CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Streets	Person Trips
Hayes(a)	2,689
Fell	310
Page	164
Market	3,312
McCoppin	1,811
Duboce	3,456
Total	11,742

(a) Hayes Street is one-way westbound to Gough. Traffic is then assumed to turn left to Gough and then right either to Fell or Market.

Source: Downtown Parking and Traffic Survey, Cordon Count, 1965.

[1]Between 500 and 600 persons go by express bus to Lake Merced via the James Lick Expressway.

Once beyond the immediate area around downtown, traffic proceeds by two main arterial routes. For points west of Twin Peaks, the northern route for outbound traffic consists of Fell Street to Kezar Drive and Lincoln Way. (The inbound route is the same except that Oak Street replaces Fell.) Congestion on Kezar Drive and Lincoln Way often causes some diversion during the afternoon peak hour through the interior of Golden Gate Park onto John F. Kennedy Drive. However, most of the afternoon peak hour traffic on this road is destined for the Richmond district. The second major direct route is Market Street, connecting to Portola Drive for west of Twin Peaks and to Seventeenth Street, Duboce and Haight for the Buena Vista and Haight neighborhoods. Some traffic uses routes through the Mission-Bayshore and Richmond-Western Addition corridors.

Over the past several years vehicular traffic during the afternoon peak hour has not increased substantially or has decreased on the major routes leading from downtown to west of Twin Peaks. This suggests a leveling off in peak hour automobile demand.

Table 49

VEHICULAR TRAFFIC ON MAIN ROUTES
FROM DOWNTOWN TO WEST OF TWIN PEAKS

Streets	1961-64	1964-66	1966-68	% increase per year
Portola Drive[a]	2,484	2,521	2,657	1.5%
Kezar Drive	1,760	1,837	--*	1.0
Lincoln Way[b]	--*	1,672	1,004	-9.0
John F. Kennedy[c]	1,708	1,547	1,571	-1.7

*Comparable counts unavailable.

(a) Between Clipper (Diamond Heights Boulevard) and Woodside.
(b) Between 19th and 9th Avenues.
(c) Between Kezar and Middle Drive.

Source: Department of Public Works, Traffic Flow Maps.

For the twenty-four hour period Kezar-Lincoln connecting to the Oak-Fell pair and Market-Portola also carry most of the automobile traffic between downtown and western parts of the corridor. Because travel is faster, substantial automobile

traffic also proceeds via John F. Kennedy Drive, causing serious problems for park users. Kezar Drive and the Oak-Fell pair are the most heavily used during the day. Traffic on these streets results from a combination of interdistrict and intradistrict movements, as well as from travel between the Sunset and downtown. Twenty-four hour traffic has been increasing substantially over the last few years on Kezar Drive and Lincoln Way, and to a lesser extent on John F. Kennedy Drive.

Table 50

VEHICULAR TRAFFIC ON NORTHERN ROUTES CONNECTING THE SUNSET WITH DOWNTOWN, 24 HOURS, BOTH DIRECTIONS

Streets[a]	1963-65	1966-68	Increase	%/year
Lincoln Way[b]	19,370	25,502	6,132	10.3
Kezar Drive[c]	31,948	33,879	1,931	2.0
John F. Kennedy Drive[d]	15,117	15,916	799	1.7
Total	66,435	75,297	8,862	4.4

(a) For Oak-Fell counts, see Tables 60 and 61.
(b) Between 9th and 19th Avenues.
(c) At Lincoln Way.
(d) Between Kezar and Middle Drive.

Source: Department of Public Works, Traffic Flow Maps.

The very large increase on Lincoln Way is primarily a result of more local traffic. The combined increase on Kezar and John F. Kennedy Drives is similar to that found on the Fell-Oak pair west of Masonic.[1] The fact that no increase has occurred on Fulton Street[2] indicates that new traffic is being generated south of Golden Gate Park. Since afternoon peak hour traffic has not increased on Fell,[3] the cause for the twenty-four hour increases seems to be additional non-work trips to downtown, as well as to other areas.

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[1], [2]See Table 61.

[3]See Table 58.

Distribution of vehicles through the Sunset for both peak hours and the 24-hour period is primarily by way of Nineteenth Avenue, Sunset Boulevard and the Great Highway in the north-south direction, feeding into the east-west portions of the grid to homes in the area. Nineteenth Avenue carries twice the afternoon peak-hour volume of Sunset Boulevard or the Great Highway since it provides access to north-south streets closer to downtown and receives traffic from both Portola Drive and Lincoln Way. Because of the concentration of traffic on Nineteenth Avenue during peak hours, it is quite congested. Traffic from downtown to the Sunset and Lake Merced combines with traffic from employment centers in the Richmond district, the Presidio, San Francisco State College and Stonestown Shopping Center on this street. However, there is very little through traffic between Marin and San Mateo counties, since very few residents of either county work in the other.[1]

Even during non-peak hours traffic on Nineteenth Avenue is heavy. It is in fact the busiest street in San Francisco, carrying 50,000 vehicles per day. This traffic is a product of the multiple traffic functions it serves. It is a major ladder street, receiving and distributing large volumes of traffic from and to the surrounding area, which moves only short distances on Nineteenth Avenue itself. Much of the travel is also interdistrict travel to major institutional and shopping areas.

Congestion on streets linking downtown to the Twin Peaks-Sunset corridor during peak hours is a result of the few routes available through the hills. It would be much worse but for the high patronage of transit. Added capacity for the major routes would not relieve congestion since the major congestion occurs at the points for entry to and exit from downtown -- Market Street, Hayes, Fell-Oak, Duboce, and other parallel streets forming parts of the Western Addition and South of Market grids, where traffic from several other city corridors come together.

Traffic counts by the Department of Public Works during the afternoon peak hour made over a four-year period between 1964 and 1968 indicate that vehicular traffic between downtown and this corridor during the afternoon peak hour is decreasing somewhat. The implication is that transit is diverting a higher proportion of peak-period travel.

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[1]Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

Future Trends. Downtown-oriented travel demand for work is not expected to undergo a major increase in this corridor since major new housing development is not likely.[1] A slight increase in travel demand for work trips to downtown may result from an increasing proportion of the population in the labor force, suggested by the declining household size.

The construction of the Muni subway as a part of BART along Market Street and through the Twin Peaks tunnel to West Portal should substantially improve transit service above present levels.

The residents immediately west of Twin Peaks will continue to have lower patronage of transit than the rest of the corridor unless improved feeder bus service is provided along with construction of the new subway, since access to the transit lines is poor for this hilly area, population density is low, and direct bus service to downtown is difficult to provide.

The high propensity of residents in this corridor to use transit, for work and non-work trips to downtown, suggests increasing reliance on it. Because almost the entire corridor is residential, any increase in traffic volumes would lead to a deterioration in the quality of the residential environment Traffic volumes on some streets in the corridor, such as Seventeenth, Duboce, Haight, Castro, Nineteenth Avenue, and Laguna Honda, are already substantially higher than is desirable.

Improved transit service for the Inner Sunset area is a means by which some traffic through Golden Gate Park, which reaches very high levels during the peak hours and disrupts the park environment, can be reduced. At present, half of the travel through the Park on Kezar Drive appears to be generated by residential locations in the Inner Sunset area.

Richmond-Western Addition Corridor

The Richmond-Western Addition corridor is the best defined. It is bounded on the east by Van Ness, on the north by California Street from Van Ness to Lyon, and by the Bay from Lyon to the Pacific Ocean. Golden Gate Park and Oak

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[1]The Diamond Heights Redevelopment Project, although actually located in the Mission-Bayshore corridor, may generate more travel through this corridor to downtown.

RICHMOND-WESTERN ADDITION CORRIDOR

CORRIDOR INDEX MAP

* *Major Trip Generators*

Street are the southern boundaries. This corridor includes the Presidio and the Outer Richmond, Inner Richmond, and Western Addition districts.

Travel between downtown and the Richmond-Western Addition corridor flows east-west directly between the street patterns of downtown north of Market and of the corridor. Major arteries between the corridor and downtown include California, Geary Boulevard, Fulton, and the Fell-Oak, Pine-Bush and Turk-Golden Gate pairs. Both automobiles and public transportation, which is provided by buses, use these routes. Some of the travel between downtown and the Sunset and North Bay also uses these arterials.

Land use in the corridor is primarily residential, with major commercial development along Geary Boulevard and Clement in the east-west direction and along Fillmore, Divisadero, and Van Ness on the north-south axis. Important institutional uses, particularly hospitals, also exist in this corridor. The population of this corridor in 1960 was 138,300 in 56,000 households. There has been a net increase in dwelling units since 1960 of at least 3,600 units,[1] but the total population is estimated to have dropped, with a higher decrease in the Richmond district counterbalanced partially by a slight increase to the east.

Amount and Purpose of Travel. In 1965, this corridor generated an estimated 49,900 trips to downtown for all purposes (Table 6). Work was the reason for 52 percent of these trips; the proportion of non-work trips was the highest for any corridor. The ratio of downtown work trips to total households is 0.46, higher than the Twin Peaks-Sunset corridor. The ratio of downtown non-work trips to households and population is second highest in the city, after the Marina corridor (Table 9).

Modal Split. Forty-eight percent of all trips to downtown in 1965 were made by transit, the second highest level of transit use for all corridors (Table 7). The total number of transit trips in one direction was 24,150, lower than the Twin Peaks-Sunset and Mission-Bayshore corridor because of the smaller population of this corridor. For work trips to downtown, transit accounted for 51 percent; for non-work trips transit carried 46 percent, the highest level of transit use for downtown non-work trips of any corridor.

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[1]San Francisco Department of City Planning, Changes in the San Francisco Housing Inventory, 1969, April, 1970.

Table 51

DAILY TRAVEL TO DOWNTOWN FROM THE RICHMOND-WESTERN ADDITION CORRIDOR, PERCENTAGE MODAL SPLIT BY ZONE

	Work Trips		Non-Work Trips		Total	
	Auto	Transit	Auto	Transit	Auto	Transit
Western Addition (Zone 5a)	50%	50%	59%	41%	54%	46%
Richmond (Zone 6)	49	51	51	49	50	50
Total	49	51	54	46	52	48

Source: Table 6.

A major reason for the overall high transit patronage in this corridor is the dense transit coverage which permits access between most locations in the corridor and downtown without a transfer. Three-fourths of all travel between downtown and the corridor requires no transfer in transit or access to stops other than by walking.

Table 52

MEANS OF TRAVEL TO AND FROM MUNI VEHICLES FOR TRAVEL BETWEEN THE RICHMOND-WESTERN ADDITION CORRIDOR AND DOWNTOWN, BOTH DIRECTIONS, WEEKDAY, 1965

Mode of Connection	Western Addition*[1]		Inner and Outer Richmond*		Total	
Transit	3,326	25%	7,496	22%	10,822	23%
Auto	240	2	1,010	3	1,250	3
Walk	10,004	73	24,872	75	34,876	74
Total	13,570	100%	33,378	100%	46,948	100%

*NCTDP zones, Appendix B.

[1]Includes part of Pacific Heights.

Source: Northern California Transit Demonstration Project, Final Report, p. 35, Table 7.

Transit use and service is relatively constant throughout the corridor. The only significant difference observable is in the non-work trip modal split between the Western Addition and the Richmond. The Richmond district has a very high proportion of transit use for non-work trips, whereas residents of the Western Addition, as in other parts of the city, favor automobile travel for these trips.

Peak Period Travel. A total of 20,150 evening peak period trips by all modes moved from downtown to this corridor in 1965 (Table 10), the lowest number of any city corridor. Peak period travel represented only 40 percent of daily unidirectional trips between downtown and this corridor, indicating the high proportion of trips originating in this corridor during the off-peak hours. As a result, there is a much more even distribution of demand during the day, requiring proportionately less transportation capacity during the peak periods.

Travel during the afternoon peak period is divided between transit and automobiles on a 58%-42% split. This high level of transit patronage is consistent with the twenty-four hour pattern. Total automobile person trips during this peak period were lower than in any other corridor (Table 10).

Table 53

PERSON TRIPS BY AUTO, TRUCK AND TAXI FROM DOWNTOWN TO THE RICHMOND-WESTERN ADDITION CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Richmond-Western Addition Zones: Western Addition	Richmond	Total
South of Market	1,657	1,500	3,157
North of Market	1,853	3,432	5,285
Total	3,510	4,932	8,442

Source: Bay Area Transportation Study Commission computer tabulations.

Table 54

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE RICHMOND-WESTERN ADDITION CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Richmond-Western Addition Zones: Western Addition	Richmond	Total
South of Market	1,068	1,602	2,670
North of Market	3,179	5,867	9,046
Total	4,247	7,469	11,716

Source: Bay Area Transportation Study Commission computer tabulations.

Table 55

PERCENTAGE MODAL SPLIT, PERSON TRIPS FROM DOWNTOWN TO THE RICHMOND-WESTERN ADDITION CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origin	Western Addition		Richmond		Total	
	Auto	Transit	Auto	Transit	Auto	Transit
South of Market	61%	39%	49%	51%	54%	46%
North of Market	37	63	37	63	37	63
Total	45%	55%	40%	60%	42%	58%

Source: Tables 53 and 54.

Transit patronage is substantially higher for origins North of Market than South of Market, probably because the parking problem is more critical in the northern section and because most of the bus routes follow the streets into the North of Market area and do not provide direct service South of Market. The effect of this pattern of service is seen in the dominance of auto traffic between Western Addition and South of Market, the only case in which auto travel does dominate.

High peak period transit usage in this corridor, highest in the city for trips to downtown north of Market Street, is partly a result of the fact that streets are highly congested

at the points of entry to and exit from downtown during the peak periods. Traffic to the Twin Peaks-Sunset, Marina, North Bay, and Richmond-Western Addition corridors is mixed together on the major east-west arteries where they cross major north-south carriers in the vicinity of Van Ness Avenue.

Almost 75 percent of all person trips by automobile in a westerly direction during the afternoon peak hour exited from downtown on four streets in 1965: Pine, Geary Boulevard (including Peter Yorke), Turk and Post.

Table 56

ROUTING OF PEAK PERIOD PERSON TRIPS BY AUTO AND TRUCK FROM DOWNTOWN TO THE RICHMOND-WESTERN ADDITION CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Streets[a]	Person Trips
Sacramento	621[b]
California	766[b]
Pine	3,780
Sutter	762
Post	1,894
Peter Yorke	1,385
Geary	1,530
Ellis	461
Eddy	493
Turk	2,869[c]
McAllister	967
Fulton	446
Grove	774
Total	16,748[d]

(a) The newly instituted downtown one-way pattern on Sutter, Post and Geary has changed the volumes on specific streets, but the general movement pattern remains the same.
(b) One-half of volume recorded assigned to destinations in Richmond-Western Addition; one-half to Marina corridor.
(c) Two-thirds of total volume recorded assumed to continue west; one-third to enter the Central Freeway at Gough.
(d) Includes through travel to other corridors and travel not originating in downtown.

Source: Downtown Parking and Traffic Survey, Cordon Count, 1965.

Except for Geary Boulevard, which has the highest vehicular capacity of any arterial in the corridor, almost all person trips by transit leave downtown during the same period on streets not heavily used by automobiles. More than half of all transit trips go via Geary (including Peter Yorke), Sutter, and McAllister.

Table 57

ROUTING OF PEAK PERIOD PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE RICHMOND-WESTERN ADDITION CORRIDOR 4 TO 6 P.M., WEEKDAY, 1965

Streets	Person Trips
Sacramento	1,228 (a)
Pine	816
Sutter	2,018 (a)
Peter Yorke	634
Geary	2,467
Eddy	1,611
Turk	809
McAllister	2,199
Hayes	1,419
Total	13,201

(a) One-half of cordon count volume assigned to destinations in this corridor; one-half to the Marina corridor.

Source: Downtown Parking and Traffic Survey, Cordon Count, 1965.

The existence of many east-west arterials in this corridor therefore makes possible specialization in use of streets by mode that is not easily achieved in other corridors, creating a potential for faster transit service.

Vehicular Traffic. Vehicular traffic during the afternoon peak hour is remaining constant. This suggests that automobile demand has leveled off.

Table 58

VEHICULAR TRAFFIC IN THE WESTERN ADDITION
4:30 TO 5:30 P.M., OUTBOUND,
WEST OF GOUGH STREET, EAST OF FILLMORE STREET

Streets[a]	1961-64	1966-68	Change	%/year[c]
California	912	947	35	0.85
Pine	1,522	1,566	44	0.64
Sutter	331	324	-7	-0.47
Post	602	711	109	4.02
Geary	1,478	1,360	-118	-1.77
Turk	1,209	1,467	258	4.74
Fell[b]	3,304	3,233	-71	-0.48
Total	9,357	9,608	251	0.60

(a) Fulton Street is not listed because no traffic count was given on the 1966-68 map.
(b) Fell Street count taken west of Fillmore Street.
(c) Average for 4-1/2 year period.

Source: Department of Public Works, Traffic Flow Maps.

Table 59

VEHICULAR TRAFFIC IN THE INNER RICHMOND,
4:30 TO 5:30 P.M., OUTBOUND,
WEST OF MASONIC AND EAST OF ARGUELLO

Streets[a]	1961-64	1966-68	Change	%/year[b]
California	1,023	944	-79	-1.72
Geary	1,587	1,572	-15	-0.21
Anza	676	721	45	1.48
Turk	1,192	1,357	165	3.08
Fulton	788	706	-82	-2.31
Fell	3,519	3,461	-58	-0.36
Total	8,785	8,761	-24	-0.05

(a) No Euclid Street count was given on the 1961-64 map.
(b) Average for 4-1/2 year period.

Source: Department of Public Works, Traffic Flow Maps.

There has been a slight increase of traffic in the Western Addition (east of Fillmore Street) during the peak period and a slight decrease in the Richmond (west of Masonic Street). In the Western Addition, twenty-four hour counts show a substantial increase in total traffic so that some peak-hour traffic may be spreading itself over a longer period but this is probably not the major cause of the increase.[1]

Table 60

VEHICULAR TRAFFIC IN THE WESTERN ADDITION,
24 HOURS, BOTH DIRECTIONS, EAST-WEST STREETS,
WEST OF GOUGH STREET AND EAST OF FILLMORE STREET

Streets	1963-65	1966-68
California	14,630	15,417
Pine	10,306	11,075
Bush	14,716	14,959
Sutter	6,349	7,057
Post	5,197	5,898
Geary	28,940	29,598
Eddy	4,252	6,431
Turk	7,978	9,383
Golden Gate	7,343	7,940
Fulton	5,969	8,292
Total	105,680	116,038
	Average increase per year: 3.3%	
Fell	21,704	25,358
Oak	23,728	26,358
Total	45,432	51,716
	Average increase per year: 4.6%	
Grand Total	151,112	167,754
	Average increase per year: 3.7%	

Source: Department of Public Works, Traffic Flow Maps.

[1]See section on non-downtown travel.

In the Richmond, traffic volumes during the peak hour are matched by relative constancy for the twenty-four hour period. The only significant increase has been on the Fell-Oak pair.

Table 61

VEHICULAR TRAFFIC IN THE INNER RICHMOND,
24 HOURS, BOTH DIRECTIONS, EAST-WEST STREETS,
WEST OF MASONIC AND EAST OF ARGUELLO

Streets	1963-65	1966-68
California	19,317	18,904
Geary	31,237(a)	30,864
Turk	9,333	10,374
Fulton	10,825	10,271
Total	70,712	70,413
	Average increase per year: 0%	
Fell	22,163	24,049
Oak	24,694	25,674
Total	46,857	49,723
	Average increase per year: 2%	

(a) Count taken at Arguello.

Source: Department of Public Works, Traffic Flow Maps.

The increase in twenty-four hour traffic on the Fell-Oak pair is a result of both the high capacity of these streets achieved by dividing directions of travel and their relation to traffic oriented to the Central Freeway and Kezar Drive during non-peak hours. As indicated by the slight decrease in traffic on Fell during the afternoon peak hour, either its capacity and the capacity of the Freeway and Kezar have been reached at peak hours or peak hour automobile demand has leveled off. During non-peak hours, the fact that traffic has not increased west of Masonic Avenue, except on Fell-Oak, indicates that the additional traffic on the pair during the day is not generated in the Richmond. It is comprised of local and Sunset-generated traffic.

Volumes during the afternoon peak hour on north-south streets have been increasing faster than on east-west streets in the corridor.

Table 62

VEHICULAR TRAFFIC IN THE RICHMOND-WESTERN ADDITION CORRIDOR, MAJOR NORTH-SOUTH STREETS, BOTH DIRECTIONS, 4:30 TO 5:30 P.M., WEEKDAY

Street and Direction[a]	1961-64	Change	1964-66	Change	1966-68	Change 1961-64--1966-68	%/ year
Van Ness (N)	--*		1,547	+169	1,716	--	
Van Ness (S)	--*		1,546	+172	1,718	--	
Sub-total			3,093	+341	3,434	--	5.5**
Franklin (N)	2,433	-99	2,334	+272	2,606	+173	
Gough (S)	2,038	-389	1,649	+395	2,044	+6	
Sub-total	4,471	-488	3,983	+667	4,650	+179	1
Divisadero (N)	699		--*		833	+134	
Divisadero (S)	797		--*		1,059	+262	
Sub-total	1,496				1,892	+396	6
Masonic (N)	906		--*		1,060	+154	
Masonic (S)	1,200		--*		1,328	+128	
Sub-total	2,106				2,388	+282	3
Park Presidio (N)	1,453	+172	1,625	+376	2,001	+548	
Park Presidio (S)	2,360	-496	1,864	+606	2,470	+110	
Sub-total	3,813	-324	3,489	+982	4,471	+658	4

N = North, S = South

* Comparable counts unavailable.
** Computed over average 2-year period where 4-1/2 year period not available.

(a) All counts between Geary and Fulton.

Source: Department of Public Works, Traffic Flow Maps.

Increases for north-south streets during the peak hour, especially in the Western Addition (Divisadero, Franklin, Gough, and Van Ness), when compared with the absence of such increases for east-west movements, suggest increased shifting among east-west streets for outbound traffic, higher rates of usage by persons destined for the Marina, Mission-Bayshore and Twin Peaks-Sunset corridors, and increased local use during peak hours. Like Nineteenth Avenue, these streets serve as ladders in the local circulation system and therefore carry a great deal of local traffic moving short distances, even during peak hours. They also carry interdistrict travel not originating in downtown. As a result, twenty-four hour increases in traffic volumes have been much higher than for the peak hour.

Table 63

VEHICULAR TRAFFIC IN THE RICHMOND-WESTERN ADDITION CORRIDOR, 24 HOURS, BOTH DIRECTIONS, MAJOR NORTH-SOUTH STREETS

Street (north or south)	(between)	1963-65	1966-68	Percent increase
Van Ness (N)(S)	(Geary & Fulton)	31,803	43,671	37%
Franklin (N)	(Geary & Fulton)	18,044	24,374	35
Gough (S)	(Geary & Turk)	23,739	29,818	26
Divisadero (N)(S)	(Fulton & Oak)	17,565	20,496	17
Masonic (N)	(Geary & Fulton)	24,481	27,403	12
Masonic (S)	(Fulton & Fell)	22,523	25,286	12
Arguello (N)(S)	(Euclid & Geary)	10,373	10,828	4
Park Presidio (N)(S)	(Geary & Fulton)	38,522	41,487	8
25th Avenue (N)(S)	(Balboa & Fulton)	9,135	10,780	18
Total		196,185	234,143	19%

Average increase per year: 6.3%

Source: Department of Public Works, Traffic Flow Maps.

Much more traffic occurs in the north-south than in the east-west direction over the entire day. The largest increase over time is found for Van Ness and the Franklin-Gough pair. The volume for these three streets has been increasing at an annual rate of almost 11 percent. Most of the cross-town traffic which is occurring in this part of the Western Addition is a result of the higher capacity of the streets. However, traffic on both Divisadero and Masonic is also increasing

during the non-peak hours as a result of pressure for north-south, cross-town movement.[1] These volumes are causing serious circulation and environmental problems in the Western Addition and Inner Richmond.

Future Trends. The only probable substantial increase in population in this area will occur as a result of completion of the Western Addition A-2 project. That project is to add about ten percent to the housing units now in the area. Construction in this redevelopment project is planned to minimize the detrimental impact of the major arterial streets passing through the area, since heavy traffic in the past contributed to decline in the attractiveness of the area as a living environment. Except for this project almost no undeveloped residential land remains in the corridor except possibly at Playland-at-the-Beach. Some increases in residential density through new housing development may occur along Golden Gate Park, Geary Boulevard and Fell Street, following the proposed amendment to the residence section of the Master Plan.[2] If increased residential development does occur, it will probably lead to an increase in demand for travel to downtown.

The construction of the Muni subway to Twin Peaks-Sunset may be expected to reduce somewhat the pressure of through vehicular traffic in the Richmond-Western Addition corridor during peak hours. The tradition of high transit patronage in the corridor itself is not likely to be reduced even if traffic from other corridors declines, so that an overall constancy and perhaps a reduction in vehicular traffic might be anticipated. Such a reduction would considerably improve the quality of the environment.

The Franklin-Gough pair and Van Ness Avenue are presently operating as quasi-expressways since traffic has been channeled onto these streets. This is seriously affecting the character of this area and pressures for changes in land use may occur. If the capacity of these streets or of similar north-south streets is increased, vehicular traffic with non-corridor origins and destinations will probably grow.

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[1]For sources of this traffic, see section on non-downtown travel.

[2]Department of City Planning, Improvement Plan for Residence, June, 1970.

If a rapid transit line were constructed along Geary Boulevard, the present heavy transit orientation of this corridor's residents would be reinforced and increased diversion of travel to downtown from automobiles to transit could be expected. Downtown-oriented travel will be matched by travel attractions within the corridor itself, thus making such a line feasible economically. Some streets are at present primarily transit streets. If some north-south streets were designated for transit priority use, transit patronage would also be increased and vehicular traffic reduced in the short run.

Marina Corridor

The Marina corridor encompasses the areas north and northwest of downtown San Francisco, including the Marina, Pacific Heights, North Beach and Russian Hill residential districts. These residential areas are the closest to downtown[1] and densities range from 20-60 persons per gross acre in the Marina and Pacific Heights to 60-100 in Russian Hill and North Beach, the highest in the city. This corridor contains some major shopping, entertainment and recreational facilities (and consequent employment). As a result it is also a major travel attractor.

Downtown-oriented travel in the corridor includes not only trips generated within the corridor but also travel generated by North Bay residents. Access between this corridor, North Bay and downtown is severely hampered by topography. The ridge forming Pacific Heights is an effective barrier to north-south movement which would permit use of east-west arterials in the Western Addition for access between the Marina and downtown. Both Russian Hill and Telegraph Hill form major barriers for movement between downtown and the North Beach and Marina neighborhoods. As a result transit and vehicular traffic is channeled into a few flows: 1) Van Ness, Franklin and Gough for access to downtown-oriented east-west arteries; 2) the valley between Telegraph and Russian Hills, primarily Columbus Avenue; and 3) northeast of Telegraph Hill along the water on Bay, the Embarcadero, Sansome and Battery. Public transit is provided by buses and cablecars.

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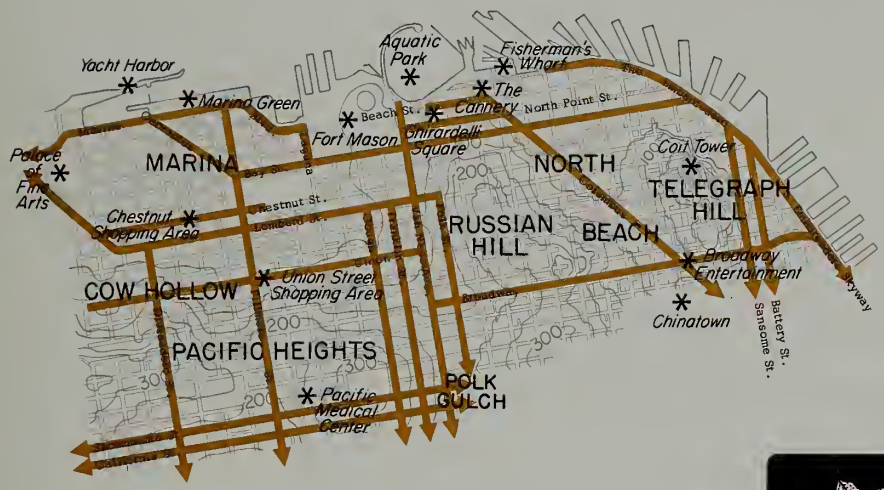
[1]Nob Hill is within downtown as defined in this report; see Appendices A and B.

MARINA CORRIDOR

SAN FRANCISCO BAY



* *Major Trip Generators*

While all economic groups may be found in this corridor, it is predominantly a middle and upper middle income area. Proximity to downtown and to the Bay makes it very desirable for downtown white-collar employees. In 1960 the population was 87,000 in 42,600 households, the lowest average household size of any corridor in the area, indicating the high proportion in the labor force. Since 1960 an additional 3,400 housing units[1] have been added.

Amount and Purpose of Travel. A total of 49,400 daily trips to downtown from this corridor occurred in 1965, of which 54 percent were work trips (26,850) (Table 6). The ratio of work trips to total households was 0.63, by far the highest in the city (Table 9). This indicates both the high proportion of the population in the labor force and the extent to which downtown employment attracts residents in this corridor. For its population this corridor generates more non-work trips to downtown than any other. Proximity to downtown is a primary reason for the high rate of travel.

Modal Split. For all trips to downtown, automobile usage dominates by a modal split of 57 percent auto and 43 percent transit, the second highest rate of automobile usage in the city.

Table 64

DAILY TRAVEL TO DOWNTOWN FROM THE MARINA CORRIDOR, PERCENTAGE MODAL SPLIT BY ZONE

	Work Trips		Non-Work Trips		Total	
	Auto	Transit	Auto	Transit	Auto	Transit
North Beach-Russian Hill	62%	38%	71%	29%	66%	34%
Marina	38	62	63	37	47	53
Total	49%	51%	68%	32%	57%	43%

Source: Table 6.

[1]San Francisco Department of City Planning, Changes in the San Francisco Housing Inventory, 1969, April, 1970.

For work trips transit carries a majority (51 percent); the overall dominance of automobile travel is caused by the very high use of autos for non-work trips (68 percent). The higher proportion of automobile travel for non-work trips is consistent with expectations. However, the low rate of transit use by residents of North Beach and Russian Hill for work trips suggests that a substantial number of unaccounted for work trips may be made on foot.[1] Both portions of the corridor are well-served by transit. The rate of transit patronage for work trips from the Marina and Pacific Heights neighborhoods can be considered high, given the high incomes of residents. Normally, automobile travel is higher as incomes increase. Most travelers (though not as many as in the Richmond-Western Addition corridor) are able to walk to downtown transit routes and avoid transfers.

Table 65

MEANS OF TRAVEL TO AND FROM MUNI VEHICLES BETWEEN THE MARINA CORRIDOR AND DOWNTOWN, BOTH DIRECTIONS, WEEKDAY, 1965

Mode of Connection	North Beach-Russian Hill Districts*		Marina District*[1]		Total Corridor	
Transit	4,524	28%	4,566	31%	9,090	30%
Auto	498	3	354	2	852	3
Walk	11,134	69	9,670	67	20,804	67
Total	16,156	100%	14,590	100%	30,746	100%

*NCTDP Transit Zones, Appendix B.

[1]Excludes part of Pacific Heights, which is included in Western Addition. See Table 52.

Source: Northern California Transit Demonstration Project, Final Report, 1967.

[1]This is likely especially with respect to travel between residential and commercial portions of Chinatown, which are divided by data boundaries. See Appendix B.

Peak Period Travel. Almost 23,000 persons left downtown by all modes during the afternoon peak period in 1965 (Table 10). This number represented 46 percent of all unidirectional travel between downtown and the corridor. Transit trips taken during this period constituted 63 percent of daily unidirectional transit travel, the highest ratio for city corridors (Table 11). This skewness in transit travel results from the high proportion of transit use for work trips.

Transit patronage during the afternoon peak period is much higher than during the day, accounting for 58 percent of all trips from downtown during this period. Total transit trips during this period were higher than for the Richmond-Western Addition corridor, although the percentage modal split was the same.

Table 66

PERSON TRIPS BY AUTO, TRUCK AND TAXI FROM DOWNTOWN TO THE MARINA CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Marina Corridor Zones: North Beach-Russian Hill	To Marina Corridor Zones: Marina-Pacific Heights	Total
South of Market	1,529	661	2,190
North of Market	2,961	4,615	7,576
Total	4,490	5,276	9,766

Source: Bay Area Transportation Study Commission computer tabulations.

Table 67

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE MARINA CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Marina Corridor Zones: North Beach-Russian Hill	To Marina Corridor Zones: Marina-Pacific Heights	Total
South of Market	898	1,648	2,546
North of Market	3,663	7,009	10,672
Total	4,561	8,657	13,218

Source: Bay Area Transportation Study Commission computer tabulations.

Table 68

PERCENTAGE MODAL SPLIT, PERSON TRIPS FROM DOWNTOWN TO THE MARINA CORRIDOR, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To Marina Corridor Zones: North Beach-Russian Hill Auto	North Beach-Russian Hill Transit	Marina-Pacific Heights Auto	Marina-Pacific Heights Transit	Total Auto	Total Transit
South of Market	63%	37%	29%	71%	54%	46%
North of Market	45	55	40	60	42	58
Total	50%	50%	38%	62%	42%	58%

Source: Tables 66 and 67.

The tables indicate both the dominance of transit in serving downtown-oriented trips for this corridor and origin of most trips in North of Market. The dense transit coverage in this area, despite topographical problems is one reason for heavy transit use. Twelve Muni bus routes and two cablecar routes serve travel between downtown and the corridor.

Peak period transit use in the Marina and Pacific Heights districts is even higher than in North Beach and Russian Hill. This is consistent with daily travel patterns and with patterns in other corridors showing more distant peak-hour trips to be heavily transit-oriented. Transit use predominates for every direction of movement except between North Beach-Russian Hill and South of Market.

Two-thirds of transit trips from downtown to corridor destinations during the afternoon peak period are made via four streets: Van Ness, Powell, Stockton, and Columbus. Bus trips to the North Bay take the Embarcadero and Van Ness to Marina Boulevard and Lombard Street. Streets used by transit, especially Van Ness, Columbus and the Embarcadero, are also heavily trafficked by automobiles during this period, suggesting that speed is not a primary factor accounting for transit usage. Convenience and economy are probably more important.

Table 69

ROUTING OF PERSON TRIPS BY ALL MODES EXITING FROM DOWNTOWN TO THE MARINA CORRIDOR AND THE NORTH BAY, 4 TO 6 P.M., WEEKDAY, 1965

Streets[a]	Person Trips by Transit Muni	Person Trips by Transit Greyhound[b]	Person Trips by Auto and Truck
Embarcadero	72	3,150	3,908
Front	--	--	112
Columbus	1,898	--	2,116
Stockton	2,990	--	678
Powell	3,123	--	519
Mason	--	--	502
Taylor	--	--	1,486
Leavenworth	647	--	1,095
Larkin	--	--	2,078
Polk	941	--	904
Van Ness	2,333	1,260	4,035
Franklin	--	--	5,922
Pacific	--	--	833
Jackson	--	--	600
Sacramento[c]	1,228	--	621
California[c]	--	--	766
Sutter[d]	2,018	--	--
Total[e]	15,250	4,410	26,175

(a) Montgomery and Kearny northbound auto traffic assumed to turn right at Broadway and enter the Embarcadero Freeway.
(b) North Bay destinations only.
(c) One-half of cordon count volume assigned to this corridor; one-half to the Richmond-Western Addition corridor.
(d) Automobile cordon count volume assigned to Richmond-Western Addition corridor.
(e) Includes trips originating outside downtown and travel to the North Bay.

Source: Downtown Parking and Traffic Survey, Cordon Count, 1965.

Much of the automobile traffic which passes through this corridor during the afternoon peak hours is from downtown to the North Bay and an additional amount originates outside downtown. The combination of these movements causes extreme congestion in the corridor.

Vehicular Traffic. At least half of outbound traffic through this corridor from downtown during the afternoon peak hour appears to be destined for the North Bay. This results from the fact that although the North Bay accounts for only 35 percent of peak period person trips exiting from downtown in a northerly direction, it accounts for almost half of automobile person trips in the same period (Table 10). Lombard Street and Marina Boulevard account for about 4,400 vehicles through to the Golden Gate Bridge during the peak hour, of which between 3,700 and 4,000 originate in downtown. These would represent more than half of the 7,000 to 7,500 vehicles estimated to exit from downtown during the peak hour and more than half of the vehicles moving from downtown on the major streets through the corridor.[1] North Bay traffic traverses the corridor primarily by way of the Embarcadero and Columbus to Bay and Marina Boulevard and via Van Ness and Franklin to Lombard Street. Because of the congestion caused by this movement on the few routes available, traffic bound for destinations in the Marina corridor filter through the area via various secondary routes.

While automobile congestion during peak hours in the Marina corridor is a critical problem, the major attractions located in the corridor have made congestion commonplace in the non-commute periods as well. The commercial and recreation activities found in North Beach, such as Fisherman's Wharf, Ghirardelli Square and the Broadway entertainment area, attract large numbers of persons during the day, evening and on weekends. Increases in daily traffic volumes on Broadway and in the Northern Waterfront are indicative of the heavy patronage during day and night.

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[1] Derived from Traffic Flow Maps of the Department of Public Works for 1964-66 and 1966-68 and from Table 10. If an automobile occupancy rate of 1.5 persons is assumed, estimates in Table 10 for 1965 would give 5,800 vehicles to the North Bay and 6,500 to the Marina corridor from downtown during the afternoon peak period, a total of 12,300. It appears from the traffic flow maps that from 7,000 to 7,500 of these vehicles exit during the peak hour. This number would represent about 60 percent of the two-hour peak flow, a reasonable proportion.

Table 70

TWENTY-FOUR HOUR TRAFFIC IN RUSSIAN HILL AND NORTH BEACH, MAJOR STREETS, BOTH DIRECTIONS

Street	1963-65	1966-68	% Increase
Broadway (at Columbus)	25,954	31,949	23%
Broadway (at Polk)	22,312	23,301	4
Sansome (north of Broadway)	7,982	11,026	38
Battery (north of Broadway)	--*	7,440	--
Columbus (south of Broadway)	13,309	13,867	4
Bay (east of Columbus)	15,044	17,022	13
Bay (between Columbus and Van Ness)	23,811	28,161	18
North Point (east of Polk)	8,219	8,265	1
Taylor (north of Broadway)	--*	5,940	--
Mason (north of Bay)	--*	4,690	--
Van Ness (north of Broadway)	35,817	36,796	3
Van Ness (north of Lombard)	13,615	--*	--
Polk (north of Broadway)	8,977	10,036	12

*Comparable counts unavailable.

Source: Department of Public Works, Traffic Flow Maps.

Few options are available to improve vehicular access to downtown from the corridor or to the corridor from other parts of the city because of the high density of population and activities. Excessive vehicular traffic is having a detrimental effect on not only the residential but also the commercial environment, although topography continues to impede traffic flows somewhat. Heavy pedestrian traffic in the area causes delays and accident hazards where vehicular traffic is also high.

Future Trends. No significant changes in the residential population of this corridor are anticipated which would affect downtown-oriented travel. Rather, trends related to North Bay movements and attraction of persons to the corridor for entertainment and shopping are the most significant factors for the future. These will be discussed in the next sub-section and in the section on Non-downtown Travel.

North Bay Corridor

Travel from the counties of Marin and Sonoma is the source of the North Bay movement into San Francisco. The Golden Gate Bridge serves as the only direct link between San Francisco and the North Bay, except for ferry boat service. Development is largely low-density and travel patterns are automobile-oriented.

The 1960 population of Marin County was 146,820. Since that time it is estimated to have grown to 204,000, a 40 percent increase.[1] Because Marin County is primarily a residential county, much of the labor force works in San Francisco, 39 percent in 1965. The 1960 population of Sonoma County was 147,375. It is estimated at the present time at 199,000.[2] Although also a predominantly low-density residential county, more economic activity exists. Due to this fact and to its distance from San Francisco, commuting from Sonoma to San Francisco is much less than from Marin.

Extent and Purpose of Travel. In 1965, 19,650 trips were made daily to downtown from the North Bay for all purposes (Table 6). Almost 80 percent of these trips were to work, with downtown attracting two-thirds of all North Bay commuters.[3] Non-work trips to downtown from the North Bay were only 11 percent of suburban non-work trips to downtown and one-fourth of North Bay non-work trips to the city. Clearly, the primary generator of North Bay-downtown travel is employment.

The rate of increase in North Bay commuting has been very high, having produced almost a doubling of commuters between 1960 and 1970. Downtown remains the primary commuter destination. The following shows the number of North Bay residents working in the city in 1965, the estimated number working in the city today, and the increase since 1960.

[1,2]Preliminary U.S. Census estimates for 1970.

[3]Appendix, Table C-4.

Table 71

NORTH BAY RESIDENTS EMPLOYED IN SAN FRANCISCO

	1960[a]	1965[b]	1970[c]	Net Change 1960-65	Net Change 1965-70
Marin County	18,000	27,170	31,000	9,170	3,830
Sonoma County	1,000	2,730	4,000	1,730	1,270
Total	19,000	29,900	35,000	10,900	5,100

Source: (a) U.S. Bureau of the Census, Census of Population, 1960. Numbers rounded.
(b) Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.
(c) Arthur D. Little, Inc., Feasibility Study of San Francisco-Marin Ferry System, 1969, for Marin County estimate and Department of City Planning estimate for Sonoma County.

Modal Split. In 1965, 75 percent of all trips to downtown from the North Bay were made by automobile, the highest proportion of any corridor (Table 7). The dominance of auto travel is consistent with development patterns in the North Bay and the minimal advantage of bus service for faster travel since buses and autos both use the Golden Gate Bridge. More recent information on Marin commuters indicates that the situation has remained about the same.

Ninety percent of all bus use is for downtown and North Beach destinations of commuters. When ferryboat use is added in (about 500 during commute periods), the proportion using transit for downtown destinations is somewhat higher. Since ferry service has been expanded, it may become more popular as a means of commuting. It has the advantage of avoiding congestion on the Golden Gate Bridge and Marina corridor arterials for access to and from downtown. Almost all transit trips are made during the peak periods.

Table 72

DESTINATIONS OF MARIN COUNTY RESIDENTS
COMMUTING TO WORK IN SAN FRANCISCO,
ESTIMATED PERSON TRIPS, 1970

Mode of Travel	Heart of Downtown*	%	Civic Center, North Beach & Outer Downtown**	%	Sub-total	%	Rest of San Francisco	%	Total
Bus	2,900	72	700	18	3,600	90	400	10	4,000
%	22%		16%		21%		3%		13%
Auto	10,600	39	3,800	14	14,400	53	12,600	47	27,000
%	78%		84%		79%		97%		87%
Total	13,500	44	4,500	14	18,000	58	13,000	42	31,000

*Not same as downtown defined by BATSC zones; includes the downtown core.

**Includes parts of Inner Mission and Western Addition.

Source: Arthur D. Little, Inc., Feasibility Study of San Francisco-Marin Ferry System, 1969.

Peak Period Travel. Afternoon peak period person trips to the North Bay from downtown in 1965 amounted to 12,600, 64 percent of total daily unidirectional travel (Tables 10 and 11). This high proportion of total travel concentrated in the peak period causes the most skewed situation in terms of facilities capacity of all corridors. It is a reflection of the extent to which work trips dominate downtown travel. Transit trips during the afternoon peak period constitute 80 percent of all unidirectional transit trips, creating a slightly higher modal split in favor of transit during the peak periods than for the 24-hour period.

Table 73

PERSON TRIPS BY AUTO, TRUCK AND TAXI FROM DOWNTOWN TO THE NORTH BAY, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To North Bay Counties Marin	Sonoma	Total
South of Market	2,617	174	2,791
North of Market	5,154	767	5,921
Total	7,771	941	8,712

Source: Bay Area Transportation Study Commission computer tabulations.

Table 74

PERSON TRIPS BY TRANSIT FROM DOWNTOWN TO THE NORTH BAY, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	To North Bay Counties Marin	Sonoma	Total
South of Market	523	78	601
North of Market	2,982	301	3,283
Total	3,505	379	3,884

Source: Bay Area Transportation Study Commission computer tabulations.

Table 75

PERCENTAGE MODAL SPLIT, PERSON TRIPS FROM DOWNTOWN TO THE NORTH BAY, 4 TO 6 P.M., WEEKDAY, 1965

Downtown Origins	Marin		Sonoma		Total	
	Auto	Transit	Auto	Transit	Auto	Transit
South of Market	83%	17%	69%	31%	82%	18%
North of Market	63	37	72	28	64	36
Total	69%	31%	71%	29%	69%	31%

Source: Tables 73 and 74.

The entire pattern is quite clearly toward heavy reliance on automobiles to reach downtown, whether for employment or otherwise. Better bus service to the area north of Market and difficulty in parking explain the higher rate of transit use to reach that portion of downtown. In contrast to patterns in some other corridors, transit is used less by Sonoma County residents, who live further away, than by Marin County residents. This is a result of the limited service and inadequacy of the collection and distribution systems within that very low-density county.

Although population is somewhat more concentrated in Marin County, transit patronage is still low. Since buses must use the Golden Gate Bridge and the same arteries as autos coming into downtown, travel by transit is as slow or slower than by automobile during peak hours.

Vehicular Traffic. Since Golden Gate Bridge is the only available route into San Francisco, traffic during the peak hours has long since reached the theoretical capacity of the bridge. As a result, much of the increased commuter demand has been satisfied by a lengthening of the commuter period. The morning peak period has expanded from the usual 7 to 9 a.m. peak period, with a sharp rise in travel between 6 and 7 a.m..

Table 76

MORNING TRAFFIC ON THE GOLDEN GATE BRIDGE

Hour	1958	1962	1964	1966	1968
6 - 7	843	1,373	1,606	2,336	3,174
7 - 8	3,704	4,804	5,622	5,971	6,394
8 - 9	3,013	4,471	5,411	5,930	6,139
Total	7,560	10,648	12,639	14,237	15,707

Source: Arthur D. Little, Inc., Feasibility Study of San Francisco-Marin Ferry System, July, 1969, Table 3, p. 11.

In 1968, a total of 23,600 persons crossed the bridge during the hours of 6 to 9 a.m. in automobiles, an auto occupancy rate of 1.5 persons. In 1960 only 14,925 persons crossed during the same period in about 9,000 automobiles. The increase in vehicular traffic has in part been caused by

a decline in transit patronage on Western Greyhound buses in proportion to rising travel demand. In 1960 the buses carried 3,575 during the three-hour period. In 1968 they only carried 3,958 despite the rise in total persons commuting, a decline from 19 percent to 14 percent of all person trips. With bus patronage not rising in proportion to travel demand, trips by automobile increased 58 percent.

About 60 percent of the three-hour total, or 9,000 vehicles, are bound for downtown and North Beach after crossing the bridge in the morning, carrying about 14,400 people.[1] These vehicles must pass through the Marina corridor. Lombard and Marina Boulevard are the major arteries through the Marina, connecting to Bay, the Embarcadero, Columbus, and Van Ness. During the two prime peak hours in the morning and afternoon, about 6,000 vehicles pass through this corridor, of which about two-thirds come through in the peak hour in the morning and afternoon (7:30-8:30 a.m., 4:30-5:30 p.m.)[2] These high traffic volumes impede movement for Marina corridor residents by causing substantial congestion on the main routes.

Future Trends. The populations of Marin and Sonoma counties are expected to grow at a rapid rate over the next twenty years.

Table 77

PROJECTED POPULATION OF NORTH BAY COUNTIES

	1970(a)	1980	1990
Marin County	204,000	336,300(b)	429,500(b)
Sonoma County	199,000	--	368,400(c)
Total	403,000	--	797,900

Sources: (a) U.S. Census preliminary estimates.
(b) Marin County Planning Department.
(c) Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

[1]Based on Table 72 and assumed occupancy rate of 1.5 persons per auto.

[2]Based on Tables 72, 73, and 76. Also, see above, p. 143.

It is estimated that almost 50 percent of any increase in the Marin labor force will work in San Francisco. Due to Sonoma County's greater distance from San Francisco and larger employment base within the county, only 15 percent of the future labor force increase is estimated to work in San Francisco.

Table 78

PROJECTED NORTH BAY COMMUTERS TO SAN FRANCISCO, 1970-1990

	1970	1980	1990
Marin County[a]	31,000	50,000	73,000
Sonoma County[b]	4,000	9,000	12,100
Total	35,000	59,000	85,000

Source: (a) Arthur D. Little, Inc., Feasibility Study of San Francisco-Marin Ferry System, July, 1969, Table 11, p. 24 (low projection);
(b) Estimate based on the projection of resident labor force in the Bay Area Transportation Report.

Since Golden Gate Bridge has reached its hourly capacity and since the peak periods of commuting are unlikely to spread much more than they have already, it is fair to say that rapid population growth in Marin County related to San Francisco employment will be dependent on improvement in access. That is to say, if improved access is made available, the projected increase in population is likely to occur. Because of Marin's small economic base, it is thus in a different position with respect to San Francisco from the East Bay and the Peninsula. Whereas growth in those two corridors may be expected, irrespective of transportation improvements, growth in Marin is dependent to some extent upon access to San Francisco for employment. Growth in southern Marin County may be seen as almost wholly dependent upon access to employment in San Francisco.

Commuting between Marin County and San Francisco is not limited to the conventional transportation alternatives. Ferry service is a real and feasible alternative mode of travel. At present ferry service operates from and to Tiburon and Sausalito during the commute periods. If the Golden Gate Bridge Highway and Transportation District pursues the

recommendations made to it in a study of ferry service,[1] it has been estimated that by 1980 9,200 commuters would use ferries to travel to work in San Francisco. Potentially, some of these commuters would have switched from automobile and bus use, reducing traffic across the Golden Gate Bridge and through the Marina corridor by up to 6,400 cars and 36 buses per day.[2] In actuality, as the number of vehicles crossing decreased, there would be a tendency for automobile traffic to achieve its peak level at the capacity of the bridge during peak hours. Thus, the ferry service, while a viable alternative form of transportation for commuters, will not greatly expand the number of persons crossing to the city nor reduce long-term vehicular traffic on the bridge during peak hours. Problems of congestion in the Marina corridor will only be alleviated during an interim period while total commuter travel demand is catching up with available facilities.

Whether improved transportation in the form of rail rapid transit will be provided will depend on the desires of Marin County. Potentially, it has been estimated that daily travel to the city from Marin could triple by 2020.[3] To date the county has expressed a desire to retain its low density residential character and to avoid devastation of its natural resources by major new highway development or population expansion. Adoption of a policy of avoiding expansion of transportation facilities, either highway or rail transit, would probably result in diversion of growth to other suburban counties, such as Contra Costa, near BART lines. If population growth is to occur but new highway facilities to be avoided, some form of rapid transit will have to be provided between San Francisco and Marin County to supplement automobile and ferry service. An increase in peak period transit patronage and consequent change in modal split, which rapid transit could achieve, would also substantially reduce traffic on the main routes through the Marina and North Beach.

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[1]Philip F. Spaulding & Associates, Inc., Golden Gate Commuter Ferryboat System, 1970.

[2]Arthur D. Little, Inc., Feasibility Study of San Francisco-Marin Ferry System, 1969.

[3]Balanced Transportation Program of Marin County, An Evaluation of Local Plans, 1970.

NON-DOWNTOWN TRAVEL

Trips to and from downtown have traditionally been regarded as the key problem for the city's transportation system. They have been so regarded because they generate the greatest strain on the capacity of the transportation system. As a result, extensive and fairly reliable data on downtown-oriented travel have been available. Data on and analyses of non-downtown travel are much sketchier. However, information available does show that well over half of all daily trips in the city involve travel outside downtown.[1] For city residents, almost half of daily transit trips and about 65 percent of automobile trips do not involve origins or destinations in downtown.[2] For non-residents 63 percent of all auto trips to the city, but only 26 percent of transit trips, involve non-downtown destinations.[3]

The reason for analyzing non-downtown-oriented travel is not primarily related to the problem of congestion. Rather the problems involved are those of total vehicular traffic in the city and access to employment and to major institutions and public services. Localized congestion occurs as a result of travel to non-downtown destinations. More often than not congestion is reflected in parking problems rather than in the capacity of streets or transit vehicles. This is true in the case of hospitals, parks and major sub-centers of employment. Attempts to solve these problems cause serious concern to residents, institutions, employers and public agencies charged with administration of public facilities, because some solutions will require large costs or a change in the character of a facility.

Non-resident travel into the city to non-downtown destinations has different characteristics and causes somewhat different problems than resident travel and is therefore treated separately. Both work and non-work trips are treated, although the data on employment-generated travel are more reliable for both city and suburban residents, despite the fact that about 80 percent of weekly trips are not related to employment.[4] More of these occur on the weekend than

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[1,2]Bay Area Transportation Study Commission computer tabulations.

[3]Appendix, Table C-1.

[4]Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

during the weekday, but even during the work-week 75 percent of all trips are non-work trips. Normally these trips are not concentrated into large movements during limited periods of time. However, there are exceptions, such as night-time travel to North Beach, weekend travel to Marin County, Golden Gate Park and Fisherman's Wharf, and daily trips to some hospital and shopping complexes in the city.

NON-DOWNTOWN TRIP GENERATORS

In order to provide a background for understanding non-downtown travel, it is first necessary to indicate the major sources of trip generation outside downtown.

Non-downtown Employment

As has been indicated, downtown employment in San Francisco is 55 percent of all employment in the city. The remaining 45 percent, or 242,000 jobs, accounts for a substantial number of work trips by both commuters and residents.

Table 79

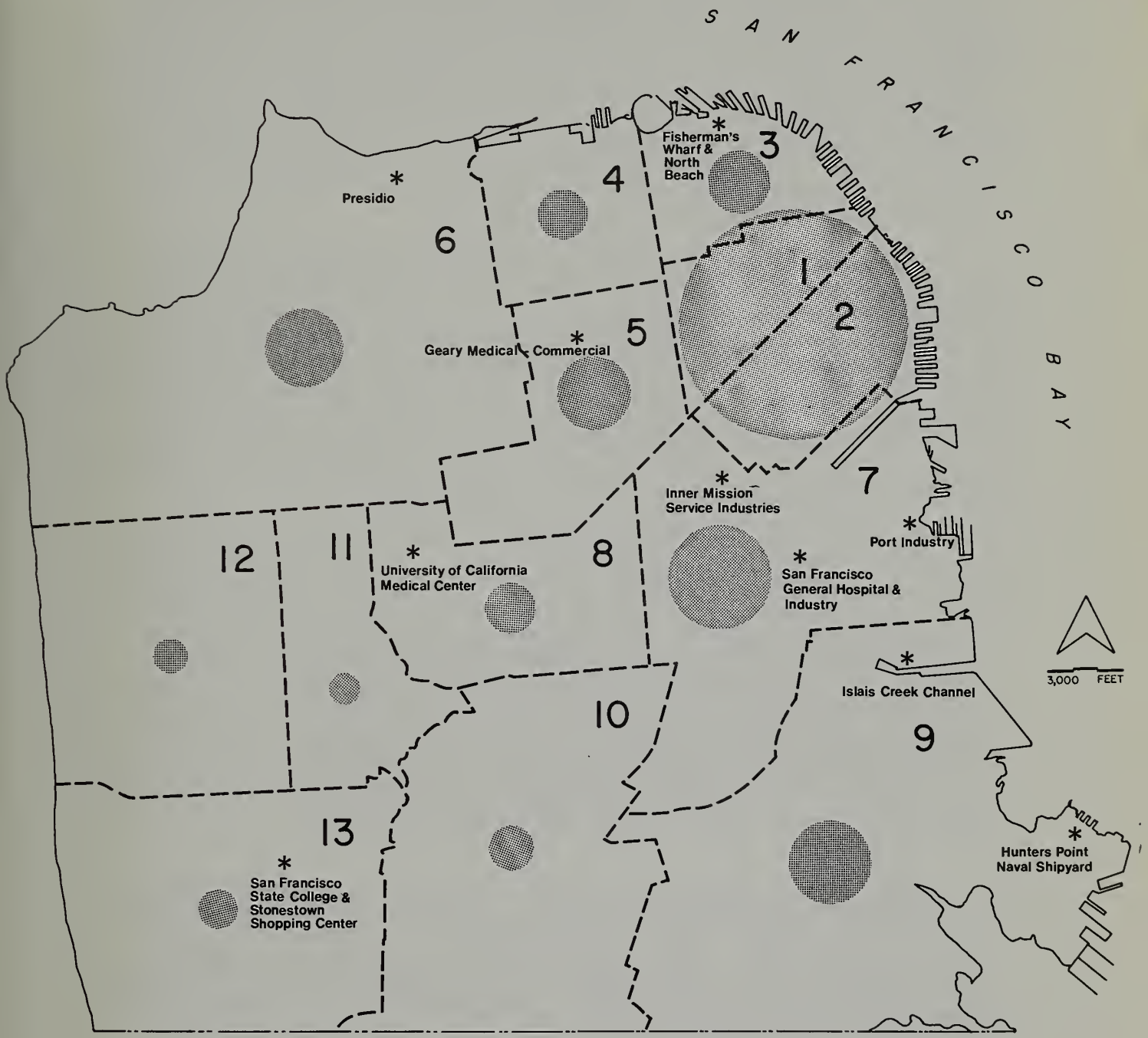
ESTIMATED DISTRIBUTION OF EMPLOYMENT OUTSIDE DOWNTOWN, 1970

Non-downtown Area*	Employment	Percent
North Beach-Russian Hill	22,800	9.4%
Marina-Pacific Heights	12,800	5.3
Western Addition-Buena Vista	29,100	12.0
Inner and Outer Richmond	33,700	13.9
Mission-Potrero	60,500	25.0
Twin Peaks-Upper Market	13,670	5.6
South Bayshore	37,710	15.6
Outer Mission	11,070	4.6
Inner Sunset	5,600	2.3
Outer Sunset	6,300	2.6
Lake Merced	8,950	3.7
Total	242,200	100.0%

*BATSC zones, Appendix B.

Source: Wilbur Smith Associates, Statistical Abstract, Four County Community Shelter Plan, May, 1970.

DISTRIBUTION OF EMPLOYMENT, 1970



AREA PROPORTIONATE TO EMPLOYEES

* CONCENTRATED EMPLOYMENT CENTER OUTSIDE DOWNTOWN

Some of outlying employment is scattered throughout the city; a substantial amount is concentrated in a small set of relatively dense employment centers. The most significant concentrations of employment on an area-wide basis outside of downtown occur in the southeastern and northwestern quadrants of the city. The Mission-Potrero and South Bayshore industrial areas account for almost 100,000 jobs, or 40 percent of non-downtown employment. The Richmond (including the Presidio) contains employment of 33,700 with the Western Addition (and Buena Vista) adding 29,000. Employment density on an area-wide basis is by far the highest in North Beach, Western Addition and the Inner Mission.

The major concentrated sources of employment, where employment density is much higher than on an area-wide basis, are Hunters Point Naval Yard (9,000) in the South Bayshore; San Francisco General Hospital and the nearby industrial area in the Mission (10,000); the varied complex of offices, large stores, colleges, and hospitals along and near Geary Boulevard (13,000); the University of California Medical Center (6,600) at Mount Sutro; San Francisco State College and Stonestown Shopping Center in Lake Merced (5,500). Each of these centers attracts travel by both employees and patrons.

Half of non-downtown employment is located in the areas encircling downtown. This means that the most heavily traveled areas of the city are and will be those around downtown due to the combination of corridor and cross-town travel. It also implies that solutions to some of the problems of downtown peak period travel will probably aid in solving problems of interdistrict peak period travel which fit into the downtown-oriented corridors but not those of cross-town travel. These points make it useful to consider the location of present and future non-downtown employment in relation to downtown-oriented travel corridors, in order to determine the extent to which solutions to problems of downtown travel will have beneficial side effects for other travel.

Employment outside downtown is primarily concentrated in the Mission-Bayshore corridor, which accounts for 45 percent of the total. The largest absolute increase is also projected for this corridor. The Richmond-Western Addition corridor will experience the second highest amount of growth, with the Marina corridor showing the largest percentage increase.

Table 80

PRESENT AND PROJECTED DISTRIBUTION OF EMPLOYMENT BY TRAVEL CORRIDORS, 1970-1990

Location	1970[a]	Change	1990[b]
Downtown	299,800	105,200	405,000
% of total	55.3%		56.7%
Non-Downtown			
Mission-Bayshore Corridor	109,280	33,720	143,000
% of non-downtown	45.1%		46.3%
Twin Peaks-Sunset	44,320	8,680	53,000
% of non-downtown	18.3%		17.2%
Richmond-Western Addition	53,000	13,000	66,000
% of non-downtown	21.8%		21.3%
Marina	35,600	11,400	47,000
% of non-downtown	14.7%		15.2%
Sub-total non-downtown	242,200	66,800	309,000
Total	542,000	172,000	714,000

Source: (a) Wilbur Smith Associates, Statistical Abstract, Four County Community Shelter Plan, May, 1970, for 1970 estimates.
(b) Department of City Planning estimates for 1990 based on Northern California Transit Demonstration Project, Final Report, 1967, and Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

Non-Downtown Institutional, Shopping and Recreational Facilities

Most non-work trip attractors outside of downtown are located in the northern part of the city in the Richmond-Western Addition and Marina corridors.[1] The largest concentration of hospitals is found near the eastern end of Golden

[1]See map of each corridor in analysis of downtown travel by corridor.

Gate Park: St. Mary's, French, U.C. Medical Center, Harkness; and farther to the east on Geary are Kaiser and Mount Zion. In addition, Sears Roebuck and the Japanese Cultural Center, the University of San Francisco and Lone Mountain College are found nearby. These facilities are not only the source of extensive employment but also of substantial patronage during the day. Golden Gate Park itself attracts large numbers of persons on weekdays and weekends.

Fisherman's Wharf, Aquatic Park, Ghirardelli Square and the Cannery, and the Broadway entertainment area are major non-work travel generators in the North Beach area. Other major non-work attractors are located in Lake Merced (San Francisco State College, the Zoo, Stonestown Shopping Center, and Harding Park), and nearby -- the West Portal shopping area and Laguna Honda Hospital. The inner Buena Vista area contains not only St. Joseph and Franklin Hospitals but also the University of California extension.

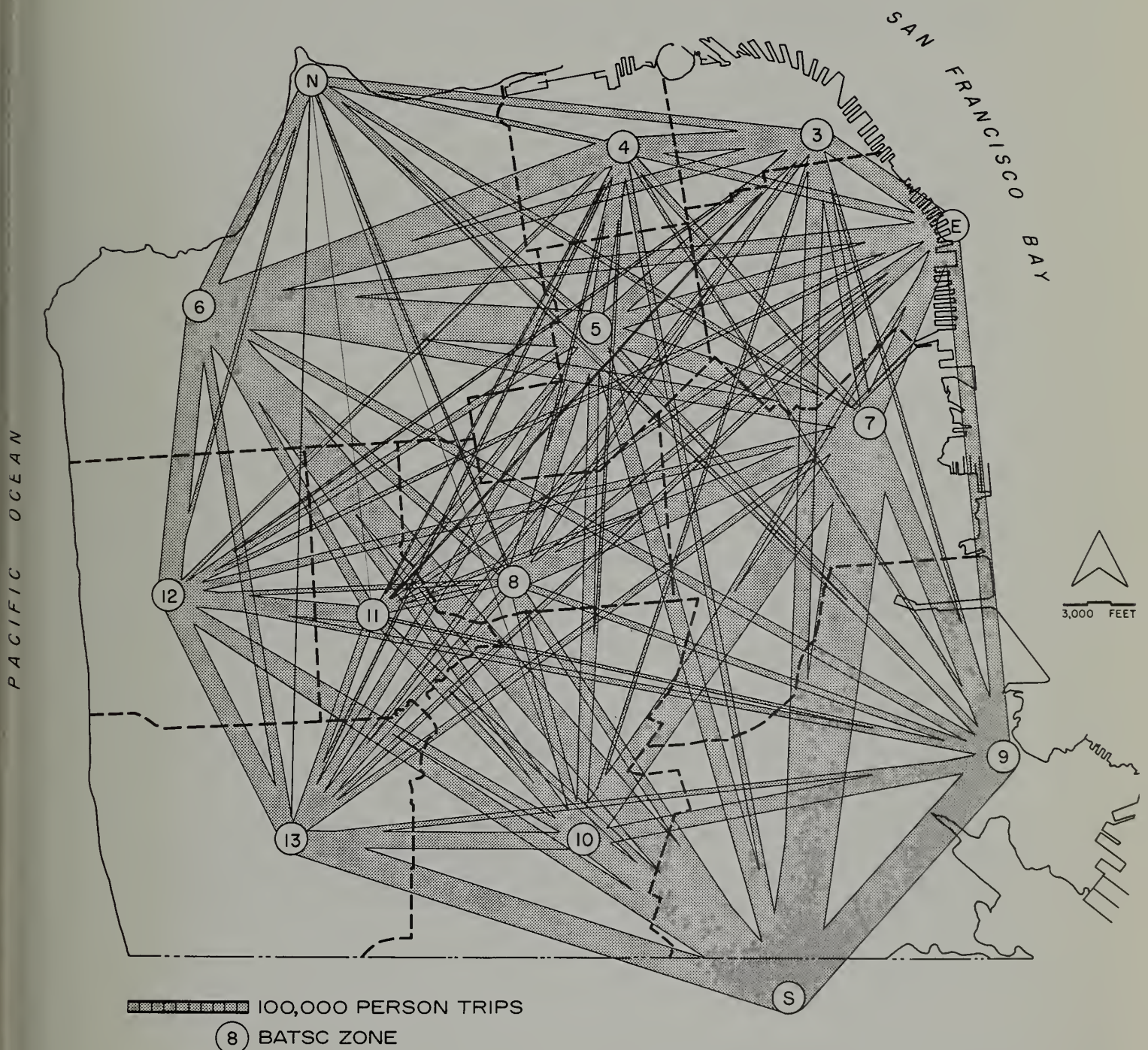
Although there is no reliable data on future growth of non-work trip attractors, consideration of projected employment and existing plans in the city provide some indication. In general, the Northern Waterfront may be expected to generate substantially increased travel by residents and non-residents for entertainment, shopping and recreation in the future, as the Northern Waterfront Plan is implemented. The percentage increase in employment projected for the Marina corridor provides some indication of expectations with regard to non-work trips to the Northern Waterfront and North Beach.

As demand for medical services continues to grow, increased travel to expanded medical facilities in the Western Addition and Inner Richmond may be expected. The completion of redevelopment projects in the Western Addition will attract more persons to the rejuvenated commercial and institutional areas.

CATEGORIES OF NON-DOWNTOWN TRAVEL

Non-downtown travel includes three important categories: (1) nonresident travel to non-downtown destinations for work and non-work purposes; (2) resident travel to non-downtown employment including reverse commuting; (3) resident travel to non-work attractions outside downtown. A total of

1965 NON-DOWNTOWN DAILY TRIPS



1965 BATSC Home Interview Data
TOTAL PERSON TRIPS: 805,600
Both Directions, 24-Hours

855,600 daily person trips in these categories were recorded between zones in 1965, not including the large number of trips made within data zones.

NON-RESIDENT TRAVEL TO NON-DOWNTOWN DESTINATIONS

Of the 306,000 daily trips to the city recorded in 1965, 172,000 (56 percent) were to destinations outside of downtown. Just less than half of these trips were to employment (Appendix, Table C-1). Both work and non-work trips to non-downtown destinations vary according to suburban origins, as a result of the tendency for physical proximity to bias travel, as well as employment and residential location choices. The rapid increase in commuters as a whole suggests that non-resident employment in both downtown and non-downtown locations is growing.[1]

From the East Bay

All East Bay residents must cross the Bay Bridge and pass through downtown to reach destinations outside downtown. They therefore compete with downtown commuters during the peak hours. Once beyond downtown, travel to non-downtown destinations is through one of the local downtown-oriented corridors. During peak periods of commuting this movement is complementary to local downtown-oriented peak period travel. That is to say that in the morning, once beyond downtown, East Bay commuters to outlying areas move in the opposite direction of downtown employees coming from the Peninsula, North Bay and the city; in the afternoon the reverse occurs. This offers possibilities for more efficient use of whatever facilities are required.

Amount, Purpose and Direction of Travel. In 1965 a total of 24,550 work trips and 21,700 non-work trips were made to non-downtown destinations (Appendix, Table C-2). East Bay commuters work proportionately less outside of downtown than other non-residents. Forty percent of non-downtown work trips, over 10,000 trips, were made to employment in the Mission-Bayshore corridor. (Another 10,000 East Bay commuters went to the Peninsula through this corridor.) The same number went to employment in the Richmond-Western Addition and Marina

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[1]See Table 4, page 27.

corridors. Only a negligible number worked in the Twin Peaks-Sunset corridor.[1]

About half of all non-work trips outside of downtown were to destinations in the Richmond-Western Addition and Marina corridors.[2] The remainder were scattered among the other corridors.

Modal Split and Peak Period Travel. About 90 percent of all trips to non-downtown destinations were made by automobile (92 percent for work trips and 87 percent for non-work trips, Appendix, Table C-2). The high proportion of automobile usage reflects the absence of direct, frequent, no-transfer service between the East Bay and non-downtown destinations. As a result a substantial amount of peak period and 24-hour vehicular traffic on the Bay Bridge is the result of non-downtown travel. Forty percent of afternoon peak period trips from work in the city across the Bay Bridge originate outside of downtown.[3]

Future Trends. No very reliable estimate of future travel from the East Bay to non-downtown destinations is possible. As employment grows in the Mission-Bayshore, Richmond-Western Addition and Marina corridors, an increase in commuting from the East Bay is likely. As BART diverts more downtown commuters from automobile use, most non-downtown commuters will probably continue to find automobile travel more desirable. This would be changed only if rapid transit connections from downtown BART stations were available into those employment corridors.

Greater non-work travel should be anticipated to medical facilities in the Inner Richmond and shopping and entertainment in North Beach. Therefore, total automobile travel through downtown and in these areas will increase.

From the North Bay

Like East Bay residents, those from the North Bay must share the single bridge available irrespective of their final destination in the city. Unlike East Bay peak period commuters, however, North Bay commuters to non-downtown destinations must share facilities with Richmond-Western Addition and Marina corridor residents moving to downtown in the morning and back again in the evening. This is because

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[1,2,3]Bay Area Transportation Study Commission computer tabulations.

almost no North Bay residents work in the Twin Peaks-Sunset corridor (except at University of California Medical Center on the edge of that corridor), which would offer the only uncongested direction of travel.

Amount, Purpose and Direction of Travel. A total of 20,600 trips to non-downtown destinations were made daily in 1965 (Appendix, Table C-4). Slightly over half were to work; 65 percent of these were to the Richmond-Western Addition (40 percent) and Marina (25 percent) corridors.[1] Almost all of the non-work trips have the same destinations, with a greater proportion to the Richmond-Western Addition corridor.

Modal Split and Peak Period Travel. Ninety-two percent of trips to non-downtown destinations, both for work and non-work purposes, are made by automobile. Transit service is virtually nonexistent for non-downtown destinations.

During the afternoon peak period about 4,100 automobile person trips are made from non-downtown origins to the North Bay, just less than one-third of all auto trips to the North Bay during this period. During the afternoon peak hour about 1,800 vehicles approach the bridge from the Richmond, most of which come from outside downtown.[2] As a result, non-downtown employees contribute to congestion on the Golden Gate Bridge during this period.

Future Trends. The similarity between downtown and non-downtown-oriented travel from the North Bay implies that some solutions to the problems generated by downtown travel could also solve most of the non-downtown travel difficulties. Since downtown travel presents the greater problem, a solution to that first should be sought. In both cases greater commuting will depend on the existence of new transportation facilities. If a transit line to the North Bay passed through the Richmond-Western Addition corridor, it would also serve the bulk of non-downtown North Bay travel demand, given current travel patterns.

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[1]Bay Area Transportation Study Commission computer tabulations.

[2]Department of Public Works, Traffic Flow Maps, 1966-68, and see section on North Bay Corridor, for travel from downtown. If an auto occupancy rate of 1.5 persons is assumed, peak hour travel would represent 65 percent of peak period trips.

About 2,500 work trips are also made to the Mission-Bayshore corridor, involving travel through the Western Addition, probably to the Central Freeway or Mission district arterials in the off-peak direction. Transit service could only be provided via a link through downtown, such as would be achieved if provision were made for the larger number of East Bay commuters moving in that direction.

From the Peninsula

Unlike the other suburban corridors, Peninsula residents have a choice among many routes to the city. Therefore, although there is some competition between downtown and non-downtown automobile commuters among available routes, in general, non-downtown commuters (except those to North Beach, South Bayshore and the Western Addition) probably do not use the freeways to the same extent as downtown commuters. The freeways are used during the off-peak hours to a greater extent.

Amount, Purpose and Direction of Travel. The Peninsula generated 105,500 trips to non-downtown locations in 1965, over 60 percent of non-resident trips to non-downtown destinations in the city. About 50,000 were work trips. This is the only suburban corridor in which a majority of commuters work in non-downtown locations. Fifty-five percent of daily 1965 work trips were made to non-downtown employment (Appendix, Table C-3). Well over half of these work trips were to destinations in the Mission-Bayshore corridor.[1] As a result, the direction of non-downtown commuter travel is generally the same as for downtown employees. Non-work trips are made primarily to the Mission and Lake Merced.

Modal Split and Peak Period Travel. Ninety-two percent of non-downtown trips were made by automobile, 90 percent for work trips and 93 percent for non-work trips. As in the case of other suburban corridors, the high rate of automobile use is a result of very limited transit service to non-downtown destinations, even during commute periods, and dispersal of employment.

The Southern Pacific Railroad links Bayside Peninsula communities to some industrial areas, having two stations near Blanken Avenue and Paul Avenue in South Bayshore and

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[1]Bay Area Transportation Study Commission computer tabulations.

one on Twenty-third Street at the base of Potrero Hill. Greyhound also provides some commuter service to these industrial areas. Travel is generally slower than on the rail and bus express lines to downtown.

Afternoon peak period work trips by automobile from the Mission-Bayshore corridor to the Peninsula amounted to over 9,000 in 1965, a third of trips during the same period from downtown. As a result, vehicles generated by employment in this corridor contribute to the substantial congestion on the freeways and arterials leading out of the city.

Future Trends. Projected employment growth in the Mission-Bayshore corridor suggests increasing travel by Peninsula residents. The relationship in the past has been strong. BART will provide for access from a small part of the Peninsula to Mission district employment and shopping but will not serve for access to the South Bayshore or port industry. As a result, continued and higher vehicular traffic is to be expected. For the foreseeable future, automobile travel to the South Bayshore will be the only feasible mode for most Peninsula commuters. If a transit line were to go through the Bay side of the Mission-Bayshore corridor between the Peninsula and downtown, then solution to the problems of downtown commuters would contribute to increased transit service for non-downtown travel.

In summary, almost 60 percent of non-resident trips into the city on a typical weekday have destinations outside of downtown. Over 90 percent of these trips are made by automobile, involving more than one and one-half times the number of automobiles entering the city for downtown destinations. As a result, vehicular traffic entering the city during both peak and 24-hour periods has been growing rapidly.

Increased non-downtown employment in the future and greater social and cultural interaction between the city and suburban counties is expected to lead to increases in this vehicular traffic, under existing transportation conditions. This traffic will be concentrated, not only on the limited routes of entry into the city, but also in the Mission-Bayshore and Richmond-Western Addition corridors where most non-downtown trip attractors are located.

Projected growth in employment for the Richmond-Western Addition and Marina corridors is less than for the Mission-Bayshore. However, because these corridors attract many commuters from the East and North Bay, for which access is the most limited, any increase in demand will cause more

problems of congestion on the bridges. In the case of the North Bay, growth is not likely to occur without new transportation facilities for either downtown or non-downtown commuting. But for the East Bay, while downtown commuters will find BART superior to automobile travel, any potential reduction in traffic on the Bay Bridge will probably be eliminated by increases in automobile traffic resulting from commuting to the Richmond-Western Addition and Mission-Bayshore corridors. Extension of BART through one or both of these corridors could avoid this occurrence and thereby tend toward a total reduction in peak period automobile demand through these corridors and across the bridge.

RESIDENT TRAVEL TO NON-DOWNTOWN EMPLOYMENT

It is estimated that 48 percent of city workers were employed in downtown in 1965. Most of the remainder worked in other parts of the city and a relatively small number commuted out.

Table 81

GENERAL LOCATIONS OF EMPLOYMENT FOR RESIDENTS, 1965

Residents Working in the City		290,750	87%
In Downtown	163,200 (56%)		48%
Outside Downtown	127,550 (44%)		39%
Residents Commuting Out		42,450	13%
Total Working Population		333,200	100%

Source: Estimates of the Department of City Planning based on Bay Area Transportation Study Commission data on work trips.

Although little reliable information exists on potential or existing travel demand by non-downtown employees, some trends can be observed which are presented here.

Reverse Commuting by San Francisco Residents

Although commuting by residents is not a significant movement in terms of the capacity of facilities, trends indicate that the amount is growing rapidly. One reason for the increase in commuting is lack of jobs in the city which can be obtained by some residents. It is difficult to estimate additional numbers who would commute to jobs if there were better transportation. The problem exists, however, and contributes to unemployment in the city.

Table 82

EMPLOYMENT LOCATIONS OF SAN FRANCISCANS OUTSIDE THE CITY, 1960-1965

	1960(a)	1965(b)	% Increase
East Bay	7,000	13,190	88.4%
%	30.2%	31.1%	
Peninsula	11,000	20,880	89.8
%	47.4%	49.2%	
North Bay	2,000	2,280	11.4
%	8.6%	5.4%	
Outside Nine Counties	3,200	6,100	90.6
%	13.8%	14.3%	
Total	23,200	42,450	83.0%

All numbers rounded.

Sources: (a) U.S. Bureau of the Census, Census of Population, 1960.
(b) Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969; "Memorandum", July 1, 1968.

Reverse commuting is estimated to have increased by 83 percent between 1960 and 1965, with more than half of the increase to the Peninsula. If that trend has continued to date, the number presently commuting out is over 60,000 and Peninsula employment is increasing its attraction for city residents.

Commuting to the East Bay. Alameda County accounts for most of the employment attracting city residents in this direction.

Table 83

EAST BAY EMPLOYMENT FOR SAN FRANCISCANS

County	1960[a]	1965[b]
Alameda	6,000	11,090
Contra Costa	1,000	1,720
Solano	--	280
Napa	--	100
Total	7,000	13,190

Source: (a) U.S. Bureau of the Census, Census of Population, 1960.
(b) Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

It is estimated that 85 percent of trips to work are made by automobile.

Table 84

PERCENTAGE MODAL SPLIT,
SAN FRANCISCO COMMUTER TRIPS TO THE EAST BAY

East Bay County of Employment	Automobile	Transit	Total
Alameda	84%	16%	100%
Contra Costa	91	9	100
Napa	100	0	100
Solano	100	0	100
Total	85%	15%	100%

Source: Bay Area Transportation Study Commission computer tabulations.

The heavy dominance of automobile travel is a result of the dispersal of employment within East Bay counties and the absence of good transit service to such destinations. The operation of BART in the near future may be expected to improve transit service between San Francisco and some centers of employment in the East Bay. The effect this will have on modal split is not known. Because automobile congestion does not now normally occur for persons moving out of the city during the morning peak hours and back during the evening, the importance of improved transit service will be felt primarily by those residents of the city who cannot afford a car and are presently unable to realize employment opportunities which exist in Alameda County. If the India Basin Bridge is built, access by auto to East Bay employment will be improved and bus service may expand accessibility for non-drivers.

Employment in the East Bay is projected to increase by 100 percent between 1965 and 1990. Population in the East Bay is expected to increase more slowly, so that net jobs available for city residents may increase. The existence of BART will probably lead to at least a doubling of reverse commuters in that direction from 1965 levels to 1990.

Commuting to the Peninsula. Commuting to the Peninsula accounts for more than half of all out-commuting. In the last decade the proportion of commuters finding work on the Peninsula has increased more rapidly than in other directions because of the growth of job opportunities in San Mateo County and its proximity to much of San Francisco. Almost all commuting is to San Mateo County.

Table 85

PENINSULA EMPLOYMENT FOR SAN FRANCISCANS

County	1960[a]	1965[b]
San Mateo	10,000	19,450
Santa Clara	1,000	1,430
Total	11,000	20,880

Source: (a) U.S. Bureau of the Census, Census of Population, 1960.
(b) Bay Area Transportation Study Commission, "Memorandum", July 1, 1968.

Automobile travel is only slightly less dominant for Peninsula-destined work trips than is the case in the East Bay.

Table 86

PERCENTAGE MODAL SPLIT,
SAN FRANCISCO COMMUTER TRIPS TO THE PENINSULA

Peninsula County of Employment	Automobile	Transit	Total
San Mateo	82%	18%	100%
Santa Clara	99	1	100
Total	83%	17%	100%

Source: Bay Area Transportation Study Commission computer tabulations.

Much greater potential for transit service serving reverse commuters exists than has been realized. The modal split now occurring is a result not only of dispersed locations of employment on the Peninsula but also of poor transit service even to major employment centers such as the cities of San Mateo and Palo Alto and San Francisco International Airport. The Southern Pacific Railroad's scheduling is not well adapted to the needs of city commuters and bus service is oriented primarily toward downtown San Francisco.

With employment in San Mateo County projected to double from 1965 levels to 1990 and population only growing by 70 percent, a potential increase in demand for travel to work in that county from the city is to be expected. Whether that demand will be realized is dependent to a substantial extent on improved transit service. If BART is extended beyond Daly City, job opportunities for residents of downtown and the Mission will be expanded. San Francisco International Airport is one of the largest employment centers on the Peninsula and is expected to increase its employment substantially by 1980. Improved transit service between San Francisco and the airport would increase accessibility to jobs for city residents.

Without improved transit service, it is to be expected that the amount of reverse commuting to the Peninsula will increase less rapidly in the future than it has in the past.

Commuting to the North Bay. Commuting to the North Bay by San Franciscans has not and is not expected to be a significant movement. The number of commuters has been about 2,000 over the past ten years.

Resident Travel to Non-downtown Employment in the City

The following table indicates the estimated general location of employment in the city for non-downtown resident employees.

Table 87

LOCATION OF EMPLOYMENT FOR RESIDENTS WORKING OUTSIDE OF DOWNTOWN IN THE CITY, 1965

Work within Residence Zone*		51,950	41%
Work outside Residence Zone		75,600	59
Live in downtown	8,700		
Live outside downtown	66,900		
Total		127,550	100%

*BATSC zone, Appendix B.

Source: Department of City Planning estimate derived from Bay Area Transportation Study Commission data on work trips for 1965.

Only 41 percent of city residents employed outside downtown work in the same general area in which they live. As a result most must travel by automobile or transit during the peak periods from home to work and back again. For downtown residents working outside of downtown, transportation is not expected to present much difficulty since downtown-oriented facilities would provide for movement in the non-peak direction, by both automobile and transit.

Available data indicate that at least 75 percent of work trips by non-downtown resident employees are made by automobile.[1] The low level of transit usage compared to

[1]Bay Area Transportation Study Commission computer tabulations.

downtown travel is understandable given present transportation conditions. Cross-town and circumferential arterial routes for vehicles are not normally congested with peak hour traffic. Employers in non-downtown locations (except in the Northeast and Western Addition) have generally been able to provide some free, off-street parking for employees and on-street parking is often available. Cross-town transit routes tend to be infrequent and circuitous and transfers are almost always necessary. The only reasonable means of travel may often be by a trip to downtown and then out again in another direction.

On the basis of projected trends there is reason to expect some increased demand for interdistrict travel to employment by city residents. Although net additional employment in the city, unless current trends are reversed, will be filled primarily by nonresidents, shifts will probably occur in the proportions of city residents working in various locations.

At present, vehicular traffic generated by residents during the peak hours occurs mainly in the same general locations as for nonresident travel -- the Inner Richmond, Western Addition, Mission-Potrero, and Bayshore districts -- because this is where the bulk of non-downtown employment is located. Resident vehicular traffic to and from these locations during peak hours thus contributes to the large amount of peak period traffic generated by commuters and downtown employees.

Current Problems and Future Trends

Some indication of the growing congestion on arterial routes caused by non-downtown city and suburban workers is given by the volumes on major arterials during the afternoon peak hour for the non-peak direction.[1]

In the Mission-Bayshore corridor, travel north on the Bayshore Freeway and Bayshore Boulevard during the afternoon peak hour is over 80 percent of travel to the south. The South Bayshore and South of Market industrial areas also generate substantial amounts of vehicular traffic bound for the East Bay which contribute to congestion on the Bay Bridge and access routes to it. Traffic north on Third Street to downtown is roughly equivalent to that moving south and in some locations much greater during the afternoon peak hour.

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[1]See map, page 75.

Westbound traffic on the Bay Bridge itself is over 5,000 cars in the peak hour and a large amount of traffic coming from the East Bay combines with downtown-originated traffic at the exit from the Central Freeway, the remainder merging with southbound traffic leaving from downtown on the Bayshore Freeway. Because East Bay-originated travel headed south must use the same vehicular routes as downtown-originated travel, congestion in this direction results in part from travel by residents of San Francisco or the Peninsula from work in the East Bay. Similarly, East Bay residents working in the southeastern part of the city must share the Bay Bridge with traffic generated in downtown.

The Twin Peaks-Sunset corridor exhibits similar patterns of counter-directional peak hour movement although less seriously than in the Mission-Bayshore. Peak hour flows north into San Francisco on Nineteenth Avenue and Sunset Boulevard are almost as great as southward movements. Variations in traffic flows between the county line and Golden Gate Park indicate that these flows are made up primarily of vehicles with destinations in the Sunset.

In the Richmond-Western Addition corridor, traffic flows down Geary Boulevard and Oak Street and into the Central Freeway are substantial during the afternoon peak hour, indicating the work trips generated by employment in this area for residents moving either across the Bay or to destinations south.

Traffic on north-south cross-town routes is also fairly high during the peak hours because of the few cross-town routes available and the lack of fast transit servicing cross-town origins and destinations for employment primarily located in the Western Addition and Inner Richmond. The large amount of employment in the Mission district generates cross-town traffic in all directions.

The City of Oakland has recently published a report which concludes that for many of the unemployed in the East and West Oakland ghettoes, lack of transportation is a key deterrent to employment.[1] That some San Francisco workers face the same problems is a reasonably safe guess, not only for possible employment outside the city but also for jobs within. Transit service for the Bayshore district has already

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[1]City Planning Department of Oakland, "People, Jobs and Transportation", December, 1969.

been shown to be poor by the high percentage of work trips by automobile made by South Bayshore residents and by Peninsula commuters working in the Bayshore industrial districts. More information is required on actual work destinations of residents in the city and in nearby counties.

The alignment of some major employment centers within and outside the city with respect to downtown-oriented travel offers some significant possibilities for improvement in the transit alternatives for trips to jobs by city residents. With half of non-downtown employment in the Mission-Bayshore corridor and a third of this within the South Bayshore district itself, it may be possible to offer more intensive transit service which complements downtown-oriented travel from this direction. The construction of BART through the Mission will improve access to employment in the Inner Mission from Outer Mission and Ocean View-Ingleside and indirectly from the northern part of the city but will not provide good service for employment on the Bayside of the corridor. Available data[1] suggest that about 25 percent of the employees in the South Bayshore area live in a broad band paralleling the waterfront from the northeast part of the city to and including the South Bayshore itself. Another 10 percent live in Alameda and Contra Costa counties and would, therefore, be attracted to a possible transfer from the East Bay BART line. Another 20 percent live in San Mateo County. In addition more than half of South Bayshore residents work either in downtown or at locations between downtown and their neighborhoods. As a result, it may be feasible to support rapid transit through this corridor in the future as employment continues to grow.

Concentrated employment in the Richmond-Western Addition corridor would also be served by improved service in the form of a rapid transit line. The combination of BART service and such a line would increase access to employment in this corridor from the Ingleside and Mission districts, as well as from East Bay residences, via BART. Where rapid transit lines are not justified, transit service may be improved by the addition of feeder bus lines serving major terminals which are accessible from various parts of the city and adjacent counties. Without some improvement in transit service, vehicular routes are going to be very congested by trips to noncentral employment during peak hours. Over the next twenty years, employment outside of downtown may grow by almost 67,000 jobs (Table 80). Half of this growth will be in the

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[1]Bay Area Transportation Study Commission computer tabulations.

Mission-Bayshore corridor. If present rates of automobile use and occupancy continue, this will mean another 50,000 cars on the road during peak hours by 1990, of which half will be in that corridor. Preservation of the residential environments surrounding these employment locations will depend to a considerable extent on whether workers can be diverted to transit use, as will solution of some of the city's unemployment problems.

RESIDENT TRAVEL TO NON-DOWNTOWN SHOPPING, RECREATIONAL AND MEDICAL FACILITIES

Approximately 80 percent of all trips made during an average week are for non-work-related purposes. During the workweek convenience shopping, school and personal business (e.g., medical, banking) trips account for the largest portion of these non-work trips. During the weekend, personal business, socializing, and convenience shopping are the largest generators of non-work trips. Recreational trips double on an average weekend day from weekday levels.[1] Over the past two decades the proportion of trips not related to employment has been increasing and their share will continue to increase as the population has more leisure time and more personal income.

Private automobiles constitute virtually the exclusive form of travel for non-work trips, except for school trips. This is reflected in the fact that about 70 percent of all trips taken by transit in San Francisco are work-related. Of the remaining transit trips taken for non-work purposes, most are taken to and from downtown destinations for shopping, entertainment or personal business. The dominance of the automobile for non-work trips is an indication of its general advantage for trips with either or both of two characteristics: 1) those involving multiple stops, such as shopping trips to stores in different locations; and 2) trips involving movement between dispersed locations.

Although downtown is the single most important attractor of non-work trips, it actually accounts for only about 20 percent of all non-work trips made by city residents during a typical weekday. Most non-work trips are made within and among outlying parts of the city throughout the day. Some relatively large numbers of trips are made to special places

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[1]Bay Area Transportation Study Commission, Bay Area Transportation Report, 1969.

outside downtown, such as the University of California Medical Center, Stonestown Shopping Center, Golden Gate Park, and Fisherman's Wharf. The remainder are scattered throughout the city and include a variety of trips made in many directions.

Trips made by residents for non-work purposes within their own home areas[1] account for about one-third of all non-work trips.[2] The proportion is higher for shopping, in which case almost half of all trips are made within the general neighborhood of residence. It is lowest for recreation, where only 10 percent occur within the neighborhood. These patterns are a reflection of the distribution of shopping and recreation facilities in the city. In addition, available data on travel do not record pedestrian trips, which are substantial within home areas. Major recreational and entertainment attractions are concentrated in a few parts of the city, chiefly in the northwestern and northeastern sections. Shopping areas are scattered throughout the city in every neighborhood. Since local traffic is not a major problem and due to the absence of data on movements within zones, the focus here is on interdistrict or interzonal trips.

Shopping Trips. Shopping trips made within zones and shopping trips to downtown account for 70 percent of total daily shopping trips. As a result interdistrict travel for this purpose is not substantial. Shopping areas in the Richmond and Western Addition attract travel from each other and from the Sunset.[3] These trips contribute to the heavy vehicular traffic on both east-west and north-south arterials in the Richmond-Western Addition corridor. They also generate traffic through Golden Gate Park and along the Great Highway. Traffic in these latter two areas causes serious conflicts with their recreational function. Speeding is probably more serious than the volume of traffic. Traffic in the Sunset district, especially on Nineteenth Avenue, is a result in part of relatively large movements between the Sunset and Richmond and the Sunset and Stonestown Shopping Center. Nineteenth Avenue and east-west arterials also carry the major portion of shopping trips within the Sunset itself.

Personal Business Trips. About a third of all personal business trips, such as medical-dental trips, are made within

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[1]Bay Area Transportation Study Commission zones, Appendix B.

[2,3]Bay Area Transportation Study Commission computer tabulations.

the zones within which people live.[1] Another 25 percent are made to downtown, a proportion higher than for shopping or recreation, leaving a little over 40 percent occurring among districts. Apart from downtown-oriented trips, most are made between the Richmond district and several other parts of the city -- the Sunset, Western Addition, the Marina and Potrero-Mission. The various hospitals, businesses, and professional services located in the Richmond and in the eastern part of the Mission are assumed to be the primary attractors.

The distribution of these trips contributes again to vehicular traffic within the Western Addition and the Mission districts. Few cross-town routes are available and most of the north-south or northwest-southeast traffic must use Castro-Divisadero, Van Ness, Franklin and Gough Streets. Major travel between the Richmond and the Sunset is via Nineteenth Avenue-Park Presidio through Golden Gate Park, Masonic, or Kezar to Fell-Oak and the north-south streets of the Western Addition. Substantial travel between the Outer Mission and the Inner Mission contributes to traffic on the Bayshore Freeway and on north-south Mission district arterials.

Recreational Trips. Most recreational trips (not including trips on foot) are not made during the weekday. Of those which are, most involve interdistrict travel because of the distribution of major recreation and entertainment facilities. Less than half of all recreational trips during a typical day involve any significantly identifiable movements at all, so that these trips are quite dispersed. Of those which are identifiable, most involve travel between various parts of the city and downtown.

North Beach, Telegraph Hill, and the waterfront area to the north are major attractors of weekday recreational trips from the Richmond, Marina, Western Addition and Buena Vista districts. Golden Gate Park, Lincoln Park, Cliff House, and the Ocean beaches attract people from the Sunset, Mission-Potrero, Buena Vista, Western Addition, Pacific Heights, and the Marina. These are the only identifiable weekday movements.

Examination of recreational trip patterns shows that the existing demand is represented chiefly by the middle and higher income neighborhoods in the city. This is another example of the problem of unexpressed demand, possibly due to the absence of transportation alternatives. On weekends,

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[1]Bay Area Transportation Study Commission computer tabulations.

travel to Golden Gate Park, Aquatic Park, the Ocean beaches, and attractions in the northeast is quite substantial. Automobile congestion around Golden Gate Park and Fisherman's Wharf is acute.

During the weekend the major flow of trips for recreation occurs from the city to Marin County and points north. A smaller but significant reverse flow occurs from Marin County to attractions in San Francisco. The weekend recreational trip demand to Marin County is higher even than the weekday peak hour commuter demand. Because public transportation for trips of this nature is almost nonexistent, the demand leads to very high congestion on the Golden Gate Bridge and in Marin County during the weekend.

The policy of Marin County with respect to the Point Reyes National Seashore and for other recreational areas in the county is to attempt to discourage further encroachment of automobiles into natural recreational areas to prevent their destruction. Some form of mass transportation is the only possible solution to the problem of this high recreational trip demand. Such transportation might be provided if a decision were made to provide rapid transit between the city and Marin for commuter trips and adequate feeder service to major recreational attractions were provided.

Because a great deal of this travel and in-city, weekend recreational demand involves trips through or in the Richmond-Western Addition and Marina corridors, improved transit service in these corridors and to the North Bay might help alleviate traffic congestion. The presence of these demands would complement the absence of weekend work trip demand for a high-capacity transit system.

SUMMARY OF PRESENT AND FUTURE TRAVEL PATTERNS

In this chapter a relatively comprehensive survey of existing travel patterns has been presented, within the limits of available data. Future travel demand has been outlined and problems in meeting future demand have been suggested. The major points which have been made are summarized in the following to make clear the implications for future planning discussed in the last chapter.

Downtown-Oriented Travel

Amount and Purpose of Travel. Over 350,000 people came to downtown from other parts of the city (62 percent) and metropolitan area (38 percent) during a typical weekday in 1965. Sixty-two percent of the trips were made for work

and most of these were made during the morning and afternoon peak periods.

Forty-three percent of all trips to work in downtown in 1965 were made by commuters from surrounding counties. Whereas 43 percent of trips by city residents were for non-work purposes, only 28 percent of nonresident trips to downtown were not for work.

Mode of Travel and Peak Period Travel. Fifty-nine percent of all person trips to downtown were made by automobile and 41 percent by public transit. The proportion using automobiles for non-work trips was 66 percent, whereas only 55 percent of all work trips were by automobile. Transit use by residents for both work and non-work trips, during the entire day and the peak periods, is higher than that for non-residents.

Almost half of all persons attracted to downtown for all purposes leave the area during the afternoon peak period, causing a serious strain on the transportation system. During this period 52 percent use transit. City residents make 58 percent of their peak period trips by transit and 42 percent by automobile, a higher rate of transit use during the peak hours than that of suburban commuters.

Direction of Travel. Travel for all purposes during the entire day and the peak period is apportioned relatively equally among the major directions of movement. Among city corridors, the southern Mission-Bayshore and western Twin Peaks-Sunset corridors produce the largest number of trips during both the afternoon peak period and the entire day. Transit use is lowest in the Mission-Bayshore corridor.

Future Trends. Changes in the number of work trips to downtown are dependent on future employment and the number of downtown employees who live outside of downtown. Although construction of new residential units such as in the Golden Gateway may be contributing to the number of downtown employees living in downtown, the total number will remain insignificant. Therefore, projections of future downtown employment are roughly correspondent with the future number of work trips from outside to be generated. It should also be noted that growth in downtown employment will itself be affected somewhat by the transportation available. As a result, it is assumed for purposes of projecting downtown employment that facilities adequate to handle the largest projected increase likely in terms of other locational factors will exist.

Downtown employment is expected to grow by 105,000 jobs or 35 percent between 1970 and 1990. At the present time, it is estimated that about 120,000 of the estimated 300,000 jobs in downtown are held by commuters from outside the city. Unless past trends are reversed and the San Francisco labor force grows at a very rapid rate, all net additional jobs in the city as a whole will be taken by nonresidents. As a result, virtually all of the new work trips will be commuter trips from the East Bay, North Bay, and the Peninsula.

The addition of 100,000 commuter trips to downtown will be far beyond the present capacity of transportation facilities. Given the current modal split and automobile occupancy rates for commuter trips, as many as 30,000 additional automobiles would be entering and leaving downtown during the peak periods. The addition of BART will provide the capacity to handle expected work trips originating in the East Bay over at least the next ten to twenty years. However, serious problems will continue to exist for Peninsula and North Bay commuters. While BART in Daly City will provide some additional help for the Peninsula, it will probably not divert enough passengers from automobiles to relieve the enormous congestion likely to result from the large increase in commuter trips during peak hours. The Golden Gate Bridge is already operating at capacity during peak hours for trips in that direction.

Were it possible to provide highway facilities to handle this increase in commuter vehicle volume, no foreseeable way exists to accommodate the increased number of vehicles which would be brought into downtown. As a result, two major alternative occurrences are likely. First, if no additional transportation facilities are provided, potential growth in population based on downtown San Francisco employment will be shifted primarily to the East Bay from the Peninsula and North Bay. Secondly, additional rapid, mass transit of some form will be extended to the Peninsula and/or the North Bay.

There is no basis for predicting the future increase in non-work trips to downtown by city residents or nonresidents. Growth in leisure time, personal income, and general mobility will lead to a natural increase in all non-work trips and, therefore, to an increase in non-work trips to downtown. If downtown employment grows as expected, a certain proportional increase in non-work trips attracted by new shopping, services, and facilities is likely. Since a much higher proportion of non-work trips to downtown is made by automobile than is the case for work trips, the problem of capacity of existing facilities, both roadways and storage facilities, will be similar to that caused by increasing work trips. Any solution to the problem of increasing work trips, however, will involve

an increase in downtown access capacity that should be more than sufficient to accommodate additional non-work trips.

Non-Downtown Travel

Although downtown presents the most serious problem in terms of the capacity of present facilities to handle projected demand, more total travel occurs in the rest of the city by residents and nonresidents to outlying employment and non-work activities.

Nonresident Travel. Fifty-six percent of nonresident weekday trips (172,000) to the city are to non-downtown destinations. Almost half of these are to employment. Over 90 percent of all non-downtown trips by nonresidents are by automobile, contributing greatly to the total amount of vehicular traffic in the city and to congestion on major arterials and freeways during peak periods. Sixty percent of these trips are made by Peninsula residents, who travel primarily to the Mission-Bayshore corridor. Most East Bay and North Bay residents travel to the Marina and Richmond-Western Addition corridors for all purposes.

Resident Travel to Work. Thirteen percent of employed city residents work outside the city, chiefly in the Peninsula but also in the East Bay. Over 90 percent of travel is by automobile. Thirty-nine percent of employed city residents work outside downtown in the city (127,550). About 75 percent travel to work by automobile. Since most employment is concentrated in the Mission-Bayshore and Richmond-Western Addition corridors, the resulting vehicular traffic is found concentrated in the Inner Mission and Western Addition on both north-south and east-west arterials. Total work trips made by city residents are not expected to increase since the resident labor force is expected to remain stable. However, present levels of peak period traffic are already high in the more congested areas.

Reverse commuting by city residents has been growing rapidly. Continuation of this trend will be substantially dependent on available public transportation from areas of the city where income levels are lower.

Resident Travel for Non-work Purposes. While 75 percent of daily resident trips are not to or from employment, one-third of these are made within areas in which residents live. Another twenty percent are to downtown. Significant movements occur to major recreational, medical and shopping facilities in the Inner Richmond, Western Addition and North Beach during weekdays and to Marin County on weekends. Most shopping trips occur within areas of residence, whereas only ten percent of

recreational trips do. Automobiles are used for almost all non-work, interdistrict trips outside of downtown, except for school trips. Non-work trips are expected to increase more rapidly than work trips, generating more vehicular traffic if current trends continue.

Vehicular Traffic. Vehicular traffic resulting from automobile use for all non-downtown travel is found concentrated primarily on streets in the Western Addition, North Beach-Russian Hill, and Mission districts, which border downtown. The presence of this traffic adds to congestion caused by downtown-oriented travel and causes serious environmental problems for residential neighborhoods. Future trends in non-downtown employment and in non-work travel portend an increase in vehicular traffic resulting from these travel demands unless transit service is improved.

Implications for Planning

In the last chapter a relatively comprehensive survey was presented on current travel patterns in San Francisco and possible future trends. Travel patterns were seen to have resulted in large part from the nature of the existing transportation system and from special factors of topography, economics, population, and land use described in the preceding chapters. The purpose of this chapter is to integrate the findings derived from analysis of travel demands and travel patterns into a coherent picture of transportation problems in San Francisco and the issues which the city faces for the future. The issues identified will provide the background for revision of the Transportation Section of the Comprehensive Plan.

Many specific examples have been given of the presence in San Francisco of the four general problems of urban transportation identified in the first chapter. The demand for trips to and from downtown for work during peak hours is the major example of the "problem of togetherness" faced today in San Francisco. Projection of future downtown employment indicates that this problem will be much more severe in the future. Lesser but important illustrations of this problem are evident in the demand for work trips to the South Bayshore, medical trips to hospitals in the Inner Richmond, and for recreational trips to North Beach, Golden Gate Park and Marin County. The major issue raised by the desire of large numbers of people to go to relatively small areas at the same times is how to provide efficiently for access to and movement within these areas consistent with their character. Other issues are also involved: how to provide for travel to these attractions without adverse impacts on other parts of the city; what effect reliance on alternative modes for travel to or within these areas will have on the future nature of activities located there; what effect on development in other parts of the city will result from making certain locations more accessible.

Also illustrated by many instances of present and projected travel patterns is the "problem of space scarcity" in the city and between the city and the region. The major example of this problem is the constraints on access to the city from adjacent counties imposed by the location of San Francisco on the tip of a narrow peninsula. With commuting to the city for work projected nearly to double over the next

two decades, major issues are presented as to whether or how to provide the additional capacity. The question of providing additional facilities must be related to other concerns, such as how to protect the natural landscape and the quality of present approaches to the city over the bridges. Other examples of the problem of space scarcity are the existence of few potential routes linking downtown with outlying parts of San Francisco, such as the narrow corridor through the hill belt to the Sunset, and the difficulty of providing new facilities for parking or for vehicular movement in downtown without substantial disruption of existing structures and activities. Examples of the scarcity of space for movement also abound in the conflicts which arise among different modes of travel -- pedestrian, automobile, and transit -- which are often forced to share the same spaces.

The analysis of travel patterns also indicates the "problem of various needs and wants" although only for that portion of the population which is actually satisfying its travel needs. Examples of the variety of travel needs satisfied are provided by the data on travel for different purposes and to various locations. Work trips are made by many people to downtown and to less concentrated centers. Some need to get to employment in the South Bayshore industrial areas, some to the Inner Richmond or to areas outside the city. Some persons can only find the goods or service they want in downtown; others in their neighborhoods. Persons with large amounts of leisure time and high incomes have a greater demand for travel to recreational attractions. The elderly and infirm require access to medical facilities. This problem does not generally raise an issue of the capacity of transportation facilities, but rather, their availability and convenience for the whole population. The major issues involve the proper balance between private and public transportation, route choices and the costs of travel.

The fourth problem, the "problem of multiple origins and destinations", is illustrated primarily by data on non-work trips. The problem is most acute for trips unrelated to employment because services and facilities for shopping, entertainment, health care, and transaction of personal business are much less concentrated than employment. The origin of most travel is at home. Few people live in proximity to all the facilities and services which they want to reach. Since residential population is spread throughout the city, trips originate at all possible locations. They trickle through the city to an overwhelming multiplicity of destinations. Capacity is not a major problem because trip demands are not concentrated in a few directions; it is a problem only in relation to the kinds of transportation services which are available.

These are the problems which San Francisco already has; they will continue into the future, but changes in factors determining travel demand will affect their dimensions. Although existing problems are already substantial, it is necessary as well to anticipate the future and the new problems it will bring.

TRENDS AND ASSUMPTIONS

In order to identify future transportation problems and to plan for them, assumptions must be made about future travel demand and available means of satisfying it. Past trends, current governmental policy, the state of technology, and observed interrelationships between travel demand and demographic and economic trends and between transportation modes and travel behavior provide the basis for prediction. Mere projection of trends is, however, an insufficient guide for transportation planning because transportation itself plays such an important role in the pattern of growth and change in cities and metropolitan regions. That the choices available to San Francisco in planning alternative levels and kinds of transportation might be clearly identified, an attempt is made to distinguish between trends whose occurrence is substantially independent of transportation decisions and those which might be significantly altered by changes in the transportation system. The basic assumptions presented below are divided into two categories to correspond with the required distinction. They are in large part derived from material presented in the prior chapters on future trends in population and employment, the existing transportation system, travel behavior, incomes, and leisure time activities.

BASIC ASSUMPTIONS NOT SUBSTANTIALLY DEPENDENT ON TRANSPORTATION DECISIONS

Regional Population, Employment, and Economic Conditions

(1) The population of the nine-county Bay Area will grow to about 7.5 million persons by 1990, an increase of 87 percent from 1965 levels.

(2) Employment in the nine-county Bay Area will grow to 3.1 million by 1990, an increase of 87 percent from 1965 levels.

(3) The highest rate of increase and the largest number of additional jobs will be in population-serving employment dependent upon the location of residential population and daytime workers.

(4) The percentage of the population of labor-force age and the percentage in the labor force will grow faster between 1970 and 1990 than the younger and older parts of the population. The proportion of the population over 65 years of age will increase, while the proportion under 25 will decrease.

Available Transportation Technologies

(1) No major development of a new form of land transportation with substantially different organizational and economic characteristics will be developed by 1990 and prove feasible as a substitute for current forms of public or private transportation.

(2) New forms of aircraft developed for shorter flights and smaller space requirements will not significantly aid in providing for intrametropolitan transportation.

(3) New forms of water transportation for rapid travel over short distances will be feasible as modes of public transportation, but will not provide capacities as high as rapid rail transportation.

(4) No radically different methods for building underground transportation routes, which will substantially reduce time and cost of construction, will be available.

(5) The gas-powered automobile will probably remain the predominant form of private vehicle.

Nonlocal Financing for Transportation Facilities

(1) Parts of the local transportation system which are also parts of regional, state, and national systems will continue to be financed primarily with nonlocal monies.

(2) Increased financial resources of the state and nation will be available for metropolitan and local public transit.

Personal Preferences in Travel

(1) Speed and cost will remain primary factors in transportation preferences for work trips. Availability and cost of transportation will remain major factors in job location choice by low-income persons.

(2) Convenience will be the primary factor in transportation preferences for daily non-work trips, with cost an important factor for low-income persons.

(3) Pleasure travel will continue to increase rapidly as a favorite recreational pastime.

(4) Convenience and comfort will become more important factors in all travel.

Work Schedules, Leisure Time and Income

(1) Reduction in average weekly hours of work will lead to some greater degree of work schedule staggering, but no major shift in work schedules to reduce peak-hour movements will occur.

(2) Leisure time available to most of the population will increase substantially, thus increasing travel demand for non-work trips.

(3) Rising incomes will lead to more non-work travel for shopping and recreation.

BASIC ASSUMPTIONS DEPENDENT UPON TRANSPORTATION DECISIONS

Distribution of Population and Economic Activities in the Region

(1) Given current trends in plans for the regional highway and rapid transit network, two-thirds of all growth in basic employment (not dependent on population distribution) in the region will occur in San Francisco, Alameda, and Santa Clara counties. The highest percentage growth rates will be experienced by Santa Clara and Marin counties.

(2) Over two-thirds of all growth in population and half of growth in population-serving employment will occur in Alameda, Contra Costa, and Santa Clara counties. Population-serving employment in San Francisco will grow at more than three times the rate of population growth.

(3) Major growth in industrial employment will occur outside San Francisco in Alameda, San Mateo, and Santa Clara counties.

Residential and Employment Locational Preferences of Regional Population

(1) Without major new transportation facilities other than those committed, Bay Area residents will continue to have a preference to work in their own counties or in adjacent counties. The completion of BART will increase the proportion of Alameda and Contra Costa residents working in San Francisco.

San Mateo and Marin County residents will have a declining preference to work in San Francisco, barring additional transportation facilities.

(2) Initial residential location decisions will be based on location of employment. Changes in employment during the life of a household will be more frequent than changes in place of residence, causing increased potential intercounty trip demand.

(3) San Francisco low-skilled and semi-skilled residents will have an increasing preference for employment outside the city in Alameda and San Mateo counties. Changes in residential location to correspond with employment location will continue to be difficult because of the cost of housing outside the city, racial discrimination, and absence of dense coverage by public transit in low-density counties.

Population and Employment in San Francisco

(1) Given current trends in transportation decisions, employment in San Francisco will grow by almost 180,000 jobs by 1990. Over 60 percent of this growth will occur in downtown. White-collar jobs will account for most employment growth.

(2) The largest number of additional jobs outside of downtown will be in the Mission-Bayshore corridor.

(3) Population will remain stable to 1980 and increase by 1990 to 755,000, somewhat higher than the level of 1960.

(4) The proportion of San Francisco residents in the labor force will rise. The number of elderly persons in the city will remain stable. The number of young adults and children will increase substantially.

(5) The number of low-income households in the city will decline somewhat by 1990.

Distribution of Activities and Land Uses in the City

(1) Given existing and committed transportation facilities, retailing, entertainment, and commercial-recreational uses will be increasingly concentrated in downtown and northeast San Francisco.

(2) Given existing and committed transportation facilities, business services and office development will concentrate within downtown near Market Street.

(3) Significant new residential development will occur in the Northern Waterfront and in the South Bayshore.

(4) Major new commercial and residential development will occur near BART stations along the Mission line.

(5) The number of small neighborhood-supporting commercial uses will diminish as downtown and sub-center concentrations increase.

Attraction of the City to Nonresidents

(1) Virtually all of the net increase in employment in the city will be in jobs held by nonresidents, causing nearly a doubling of commuters by 1990.

(2) The city will continue to draw increasing numbers of nonresidents to the city for shopping and entertainment.

(3) Without major new transportation facilities, non-work trips to downtown will be increasingly represented by East Bay residents.

Resident Preferences in Travel

(1) Residents will continue to prefer transit to a high degree for trips to downtown, but will have a continuing preference for automobile travel to non-downtown locations for work and non-work activities.

(2) Travel to Marin County for recreation will continue its popularity during weekends, but an increasing number of persons will travel down the Peninsula for recreation.

(3) Commuting out to jobs in other counties will increase, although residents will continue to prefer employment locations in the city.

The assumptions which can reasonably be made about future factors influencing transportation requirements have certain clear implications concerning the issues San Francisco faces, both for matters over which the City has little control and those over which it does. Trends which San Francisco can take as given in terms of transportation planning relate primarily to the total level and nature of population and economic growth in the Bay Area, the kinds of technology and nonlocal financing available, the primary factors of importance to travelers in choosing among modes of travel, such as convenience and cost, and work schedules which determine peaking in travel demand. The main thrust of anticipated trends is toward more of everything that is a problem now:

a larger regional population and labor force, increasing numbers of work trips during peak periods, and increasing travel for non-work purposes.

There are other trends over which San Francisco alone has little control. These are the trends in distribution of population and economic activities in the region, which could be influenced by transportation decisions made by a regional decision-making body or cooperatively by the county governments in the region. Although some local influence can be exerted on these trends, the City's own planning can alter them very little. Substantial population and economic growth projected to occur in portions of the Bay Area relatively distant from existing concentrations implies longer-distance commuting and increasing reliance on automobile travel in the low-density counties and for intercounty travel. Insofar as their immediate effect on San Francisco, these trends present a problem only as they relate to substantial projected growth of employment in San Francisco itself and shifts in the job market to the disadvantage of residents seeking industrial employment.

The predicted disparity between levels of population and employment in the city implies a vast increase in commuting to the city from adjacent counties if adequate transportation is made available. In addition, most of the increase will be in travel to work in downtown. Whether and how the projected growth will occur, where the commuters will come from, and how this travel will be provided for are major issues subject to being influenced by local transportation decisions. Other trends which transportation planning by the City will influence include the modes by which residents, as well as commuters, will choose to travel for a variety of purposes, employment opportunities for the unskilled and semi-skilled labor force, and the size and characteristics of the city's population.

Identification of those aspects of the future which the City can influence within the context of those which it cannot, raises the basic issues for future transportation planning and defines the range of choices available.

CHOICES AMONG FUTURES

Policy choices in transportation planning must be made in accordance with overall community goals, as well as success in serving travel needs. Desirable capacities of the transportation system and tolerable levels of congestion, the use of various modes according to their suitability for a transport function, feasible costs, appropriate financing and fare

schedules, the effect of transportation networks and modes on the environment, and contribution to the solution of social and economic problems are all matters for consideration. The major issues which must be resolved by decisions on these matters come forth clearly from the analysis of travel patterns and the set of assumptions about future trends. Although not the only questions to be asked and answered, the issues discussed in the conclusion to this report constitute the primary ones which the city now faces and will face for the foreseeable future. They are 1) the function and presence of automobiles in the city, 2) the effect of alternative transportation plans on the economic and physical growth of downtown, and 3) the availability of transportation to provide increased mobility for the least mobile and most disadvantaged residents in the city.

AUTOMOBILES AND THE CITY

The foremost problem in the city is the conflict between increasing automobile travel in San Francisco and preservation of the character and quality of life in the city. Throughout the nation the automobile has become the primary mode of travel. Although San Franciscans use automobiles proportionately less than residents of most large cities, automobile ownership in the city in relation to its size and physical character is quite high and has been increasing over the past two decades. In addition, nonresidents bring about half again as many cars into the city each weekday. The popularity of the automobile is a function of the great flexibility and convenience it provides in serving a variety of trips. It also involves large costs in terms of personal expenditure, adverse impacts on environmental quality, loss of public transit patronage and the large amount of space consumed in movement and in storage.

The greatest problem for the future is likely to occur as a result of nonresident automobile travel to the city. Over the next twenty years the doubling of employment in San Francisco without a notable increase in population will mean at least a doubling of daily commuter travel into the city, chiefly during the peak hours. Facilities designed to handle peak period automobile travel are presently saturated in at least two corridors -- the East and North Bay -- and are likely to be used to capacity in the Peninsula corridor as well within a few years. Because of the large amount of space required for automobiles per person trip, they are least suitable in serving peak hour movements. Additional facilities could, however, be provided in the form of new bridges across the Bay and new freeways into the city

servicing the major employment locations. The construction of such facilities would require the acquisition of land presently used for a variety of activities and would imply a major change in the physical character of various parts of the city, additional filling of the Bay and blocking of views, and at least a temporary disruption of on-going business activities and residential neighborhoods.

Nor is the problem caused by increased growth in commuter travel solely a problem of automobiles. Providing increased transportation capacity for peak period levels of demand by whatever mode will require enormous costs, disruption, and some environmental problems. The choice among modes is only one choice. More basic to the problem is a choice with respect to growth. Growth in employment in San Francisco will have its costs, among which transportation facilities will be only one. Before planning for new transportation facilities, the City should decide what level of growth it desires. Once that issue is decided, choices may be made as to how best to provide for whatever level of travel is desired and for what level of congestion is tolerable.

However, the problems caused by automobiles are not now and will not in the future be restricted to the influx of commuter vehicles during the workday. Local automobile traffic in downtown and in the northeast section of the city, along major streets, and in the Mission and the Western Addition is causing problems of environmental impact on neighborhoods and on the proper functioning of compact and economically important activities. Even without a significant increase in the city's population, growing leisure time and changes in population composition will lead to an increase in travel demand for all purposes. Without any major change in trends, these factors will lead to increasing traffic in the city throughout the day and night.

The kinds of changes that might be made to increase the capacity of the street system will determine the impact on residential areas and the location of commercial activities. Although changes in the street system have a smaller impact, project by project, on development patterns and neighborhood cohesion than construction of new freeways, they have more immediate effects on adjacent land uses. Two major problems presented by attempts to increase capacity to handle increased vehicular traffic are the narrowness of many public rights-of-way and the presence of residences on virtually every street in the city.

Some aspects of environmental quality in San Francisco cannot be controlled within the foreseeable future if

automobile traffic is to increase. Unless radical changes in technology occur, the automobile will continue to be a major polluter of the air and air quality can on occasion reach unpleasant and even dangerous levels. The noise caused by gas engines in traversing the rugged topography of the city will remain as a problem to be solved for both automobiles and gas-powered buses. Buffering by landscaping, grade separation, or solid walls or expanding the distances between streets and buildings is required to diminish the noise as it affects places of residence and work. To accomplish this reduction in noise pollution may require some major changes in the street system and buildings bordering on it.

A common misunderstanding is that there are many streets in San Francisco which are bordered by predominantly nonresidential uses. With few exceptions, every street in the city outside of the downtown core and the concentrations of industry is lined predominantly with residences. Even within greater downtown, residences predominate in many parts -- Nob Hill, Chinatown, and in sections near the Civic Center, entertainment district and south of Market Street. Because of this fact, even on streets which have long served as major thoroughfares heavy traffic is deleterious to the quality of the living environment for residents on these streets. Most heavily traveled streets pass through the more densely populated neighborhoods in the city, where pedestrian traffic is heavier, little private open space exists, and distances between houses and the street are less than in single-family home districts. Thus, the problem of automobiles in the city is not merely a problem for the future, nor is it a problem of channeling existing traffic onto nonresidential streets. The problem is already serious and nonresidential streets are too few to provide for the amount of traffic which now exists.

In summary, San Francisco is experiencing a time of choice in the question of the extent to which the city wishes to provide for satisfaction of increasing travel demand by private automobile. Peak hour demand for trips to downtown, especially from commuters, will cause the most serious problem. While BART will substantially expand service and capacity for the East Bay, congestion will continue from the North Bay with buses and cars continuing to move through the city to downtown and to other places of employment. Vehicular traffic from the Peninsula will increase and begin to filter through more city streets as freeways become more congested. Unless San Francisco is willing to undergo a radical change in its physical character or suffer a decline in the quality of the environment, the implications are that this commuter demand, if it is to be satisfied, can only be

provided for by rapid transit which has the capacity to carry large numbers of persons to downtown within a short period of time in relatively little space.

As in the case of commuter travel convenient public transportation for local travel is the only way to limit vehicular traffic. The choice must be made between increasing reliance on transit, which has always had substantial patronage in San Francisco, or increasing reliance on automobiles for these movements. Because non-work trips, chiefly outside downtown, are expected to increase in the future, the problem of satisfying resident demand for non-downtown travel in the city may be more severe than for downtown travel in terms of the impact of automobiles on the city's physical, economic, and social environment. In some cases walking can become the primary mode for short-distance trips. Reliance on pedestrian access within densely concentrated portions of downtown and North Beach is a reasonable alternative as it is for short trips within neighborhoods to stores, parks, schools, and similar facilities. Therefore, the need for pedestrian travel facilities must be balanced against the need for automobile or transit facilities where pedestrian movement is appropriate or desirable.

Under foreseeable conditions it is unlikely that travel by automobile will decline in absolute amount by any sizable degree even with major decisions in favor of transit and pedestrian access. For some kinds of recreational and shopping trips the only feasible mode will be the automobile. Because the demand for such trips is increasing relative to other trips, pressures will continue for increased automobile travel. If it is desirable to maintain or reduce the level of traffic in the city, it will be all the more necessary to expand public transportation to handle as much travel as possible.

DOWNTOWN AND ALTERNATIVE TRANSPORTATION SYSTEMS

Because downtown is the most intense area of activity and the economic nerve center of the city, it presents a special problem with respect to alternative transportation systems. Projected future growth of employment and commercial activity requires close attention to the choices available with respect to 1) concentration of future growth in downtown or its distribution in other growing employment and commercial centers, 2) the extension of downtown, if it is to grow substantially, over a larger land area or its continued compactness, 3) provision for travel to and from downtown, and 4) provision for travel within downtown. The question of how to provide for travel to and from downtown

has already been presented because the choice is primarily between automobiles and transit.

Whether, where, or how downtown growth occurs will be dependent in many respects on transportation decisions. Major economic activities are most susceptible to the influence of alternative transportation systems. Because rapid rail transit routes provide the highest capacity for movement, the location of transit routes and of major terminals will be prime determinants of the growth pattern.

With the construction of BART, accessibility to downtown will increase relative to other parts of the city from the East Bay, the Mission, and northwestern parts of the Peninsula. However, accessibility will also increase to commercial activities and employment in the Mission district at transit stops and some growth may be diverted into the Mission from other parts of the city. Any other new rapid transit lines will have similar effects.

Decisions on transportation improvements which occur within downtown and choices among modes, terminals, and street changes will influence the location and nature of development within downtown itself, under an assumption of substantial future growth. BART terminals along Market Street will continue to make nearby locations the most attractive for office buildings and retail services which depend on high accessibility for workers and customers. Major employment in downtown is concentrated in the relatively small core and will continue to be so if transit routes are not altered and intra-downtown transportation by automobile is not increased. It is in these most densely developed portions that parking and vehicular movement are most constrained. Future decisions on provision for intradowntown movement and for movement to downtown will determine whether growth remains relatively concentrated or begins to decentralize within the greater downtown area and into North Beach and the Western Addition.

Present understanding of the functioning of downtown activities suggests that the more compact the area of intense use, the more efficient is the transaction of business and the more attractive is downtown for consumers. If downtown is to remain a relatively small, cohesive area, travel should be primarily on foot and by special transit systems which provide for movement within the downtown. If it is considered desirable to spread out activities, then improved parking facilities and higher capacity streets within the greater downtown area should be provided in conjunction with location of public facilities and freeway links. Pedestrian movement as a primary mode of intradowntown travel would then be downgraded.

As of the present, the commitment of the city is to a compact and cohesive downtown district, with the greatest intensity of use in the financial district and on both sides of Market Street for limited distances. If this commitment is to be perpetuated, then transportation decisions should discourage further automobile traffic in favor of greater reliance on pedestrian movement and short-distance public transportation.

MOBILITY FOR THE LESS MOBILE

There are thousands of people living in San Francisco who have very restricted mobility because of the high cost of automobile ownership, inability to drive, or the unavailability (and sometimes high cost) of public transportation. Mobility is an essential ingredient to the poor in improving their economic conditions. Without it, potential employment is either unknown or inaccessible under any reasonable conditions. As a result better jobs cannot be found or taken, unemployment will remain a chronic problem for many who need not be unemployed, and continued poverty will contribute to increased problems of social adjustment and educational advancement for future generations.

Changes in economic conditions in the city and the rest of the metropolitan region suggest that, without some major reversal of trends, the availability of jobs for persons with low educational attainments or skills will decline within the city relative to other parts of the metropolitan area. Even within the city, jobs not requiring high educational levels and technical skills will be located primarily outside of the downtown area. Transportation to outlying job locations in the city and the region is inadequate to serve the needs of the poor. Service is no better outside the city so that changes in residential location would be of little help. Much of the city's poor population live in the Inner Mission, the Western Addition, South Bayshore, and in greater downtown. BART will improve access to Alameda County industrial employment for Mission and downtown residents.

Access from the South Bayshore to any location of employment is at present the poorest in the city. Although substantial employment exists in the South Bayshore itself, it cannot be expected to provide employment for all residents of that area.

If employment and poverty problems are to be helped toward solution, a choice must be made regarding the contributions which some improvements in transportation can make. The only alternatives would seem to be to assume that job

seekers will move closer to available employment or that unemployment will continue for many persons. The first is unlikely because of the absence of inexpensive housing and adequate transportation in less densely developed parts of the region. The second is undesirable from the point of view of poor residents and the city as a whole. If mobility for the poor to employment resources is to increase, transit service will have to be improved at prices that can be afforded.

Mobility is not only a problem for the poor seeking jobs. It is a problem for the poor in all aspects of life, because of the limited alternatives available for shopping, use of public facilities and services, and educational advancement, where travel is expensive and difficult. It is also a problem at present for those who do not or cannot drive. Many elderly persons and an even larger number of youth do not have the ability to operate an automobile, regardless of cost. In many cases this disadvantage means that their ability to travel to parks, schools, shopping areas and similar facilities beyond reasonable walking distances is restricted. This is particularly the case for non-downtown trips. The simplest kinds of trips, which automobile owners take for granted, are major problems for these persons.

Public transportation is the only feasible means to provide for the needs of the least mobile and costs must be relatively low. To the extent that the majority of the population relies on automobiles for travel in the city, it will appear more difficult and less justifiable to provide frequent and convenient public transit because the overall level of patronage will be lower. If the needs of the disadvantaged are to be met, the City must choose between subsidizing transportation for their benefit in some manner or encouraging greater total use of public transportation so that the costs of service will be spread over a larger number of users.

* * *

The overall implication of the major decisions facing San Francisco with regard to transportation is that the city has a choice among two futures: a future in which the city is changed substantially or a future in which the transportation system is changed substantially, to satisfy travel requirements. The nature of the transportation system and the nature of the city are interdependent decisions. Choices must be made which conform to the kind of city in which residents want to live, work and play.

Appendices

APPENDIX A -- DEFINITIONS

Because some of the terms used in transportation analysis are not in common usage, definitions are provided here to aid the reader in understanding the more technical terminology used in the report.

corridor
: Used generally to describe a specific channel in which movement flows and, when a name is attached in this report, to describe travel between downtown San Francisco and a general area of the city or region.

destination
: The location at which any trip ends. The location is identified by BATSC zones or combinations of them, as in the case of origins, for which see Appendix B.

downtown
: For this report for San Francisco, is defined generally as BATSC zones 1 and 2 or the Metropolitan Traffic District, for which see Appendix B.

  downtown core
  : That portion of downtown including the financial, entertainment and retail districts.

  outer downtown
  : The rest of downtown as defined above, including Civic Center, Midtown, Nob Hill, and South of Market.

downtown-oriented travel
: Trips involving either an origin or destination in downtown.

feeder service
: Transit service to and from line-haul facilities.

line-haul
: That portion of a trip, usually by rail transit, which involves a relatively long-distance movement between two generalized areas, such as the East Bay and San Francisco, not including the portion of the trip involving movement from places within either area to the point at which the line-haul

facility if available. Used generally to distinguish problems of collection and distribution of passengers on rail transit to and from terminals from problems of providing for the transit trip itself.

modal split
The number and/or percentage of persons traveling in a particular direction (or from an origin, or to a destination) by mode of travel, chiefly automobile and public transit; used to describe the relative use of the two predominant modes.

mode
Any means by which travel is effected (specifically: auto, taxi, bus, rapid transit, commuter rail, ferries, etc.); generally used to refer to whether travel is by private automobile or some form of public transportation.

occupancy rate
Average number of people per vehicle; obtained by dividing the number of person trips by the number of vehicles; also called vehicle or automobile occupancy rate.

off-peak hours
All hours not included in the peak periods.

off-peak direction
The direction of least travel during a peak period, generally within a specific corridor.

origin
The location at which any trip begins. The location is identified in relation to the zone used for collection of data, in the case of this report, zones used by BATSC or combinations of such zones into corridors.

peak direction
The direction of most travel during a peak period, generally within a specific corridor.

peak hour
Either the morning or afternoon peak hour, during which total travel is higher than for other hours in the twenty-four hour period; peak hours are produced primarily by the concentration of work trips twice a day.

afternoon peak hour
The 60 minutes on a weekday afternoon during which travel volume is greater than for any other afternoon hour; results from similarity in business closing times and trips to home from non-work attractions before dinner.

morning peak hour
The 60 minutes on a weekday morning during which travel volume is greater than for any other morning hour; results from similarity in business opening times; only the afternoon peak hour usually has a higher volume.

peak period
A period, generally two hours, including the peak hour, when travel is higher than for any comparable period and includes most work trips.

afternoon peak period
Usually 4 to 6 p.m., under present conditions, and when travel volume is higher than any other afternoon two-hour period.

morning peak period
Usually 7 to 9 a.m., under present conditions, when travel volume is higher than any other two-hour morning period; only the afternoon peak period usually has a higher volume.

person trip -- see trip.

terminal
A location, usually including a building, at which a public transit line, including rail, bus, ferry or helicopter terminates; usually used to refer to a location and building at which several different routes terminate, thus making it a transfer point not only from transit to walking but from transit to transit.

transfer point
A location at which transit routes cross, or meet, so that one can change from one route to another; usually used to refer to locations outside downtown, not including a building, at which several transit routes cross or terminate.

transit stop
Any location at which a bus or rail vehicle stops to take on or leave off passengers.

travel attractor or trip attractor
Same as travel or trip generator.

travel generator or trip generator
A facility or location which produces (or attracts) a relatively large number of trips, such as a school, park, recreational facility, shopping center, or location of employment.

trip

Movement from an origin to a destination.

person trip

A person moving from one place to another, as contrasted with vehicular trip. More than one person in each vehicle gives rise to more person trips than vehicular trips. This is a measure of the total travel volume regardless of the number of vehicles used.

vehicular trip

A vehicle moving from one place to another, usually an automobile; used as a measure of vehicular traffic volumes.

automobile person trip

A person making a trip by automobile; also called automobile trip.

transit person trip

A person making a trip by transit; also called transit trip.

work trip or work person trip

A person making a trip to or from work.

non-work trip or non-work person trip

A person making a trip not to or from work, such as:

social trip

A non-work trip made for purposes of socializing, meeting friends, visiting relatives.

recreational trip

A non-work trip made for purposes of recreation or entertainment, such as to or from a park, restaurant, sporting event, or a weekend outing.

personal business trip

A non-work trip made for a variety of personal reasons, including trips for medical-dental, banking or insurance purposes or accomplishment of some errand, not including shopping.

shopping trip

Trip to a store for purpose of purchasing a good or service, including convenience and comparison shopping. Convenience shopping includes trips to purchase goods consumed daily or weekly, such as food and beverages. Comparison shopping includes trips to purchase goods less frequently bought, such as clothing, appliances, and furniture.

APPENDIX B -- MAJOR DATA SOURCES

Data presented on travel patterns come primarily from the Bay Area Transportation Study Commission (BATSC) study conducted in 1965. Data produced by other studies were also used both to check and to supplement the BATSC data. Following is a brief description of the nature of the major studies used and problems encountered in reconciling some disparate data.

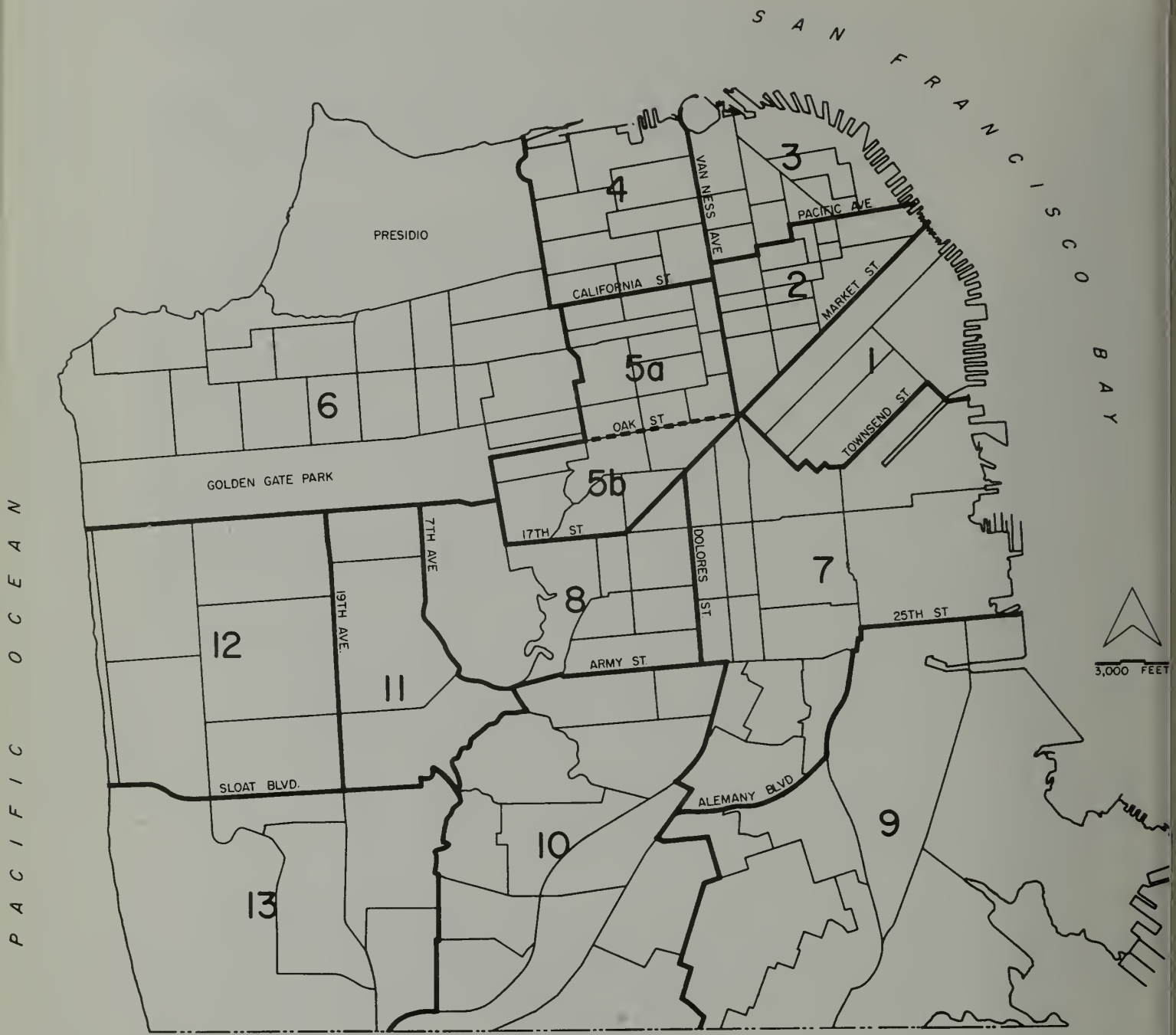
1. BATSC Home Interview Data

Computer tabulations were acquired by the Department of City Planning from BATSC. The tapes contain information elicited from a home interview sample of Bay Area residents conducted in 1965 and expansion of the sample for the entire household population. These tabulations include the origins and destinations of all trips by purpose and mode made on a typical weekday (24 hours) to and from each of the nine Bay Area counties and thirteen zones within San Francisco. Tabulations are also available for trips made between 4 and 6 p.m. on a typical weekday. BATSC zones are roughly but not wholly correspondent with planning districts used by the Department of City Planning but can be described more easily in terms of common community names. The following provides a general description of the relation between BATSC zones and identifiable areas of the city:

BATSC Zone Number	Area of City/common names
1	Downtown (south of Market)
2	Downtown (north of Market)
3	North Beach-Russian Hill
4	Marina-Pacific Heights
5a*	Western Addition
5b*	Buena Vista-Haight Ashbury-Haight Fillmore
6	Inner & Outer Richmond
7	Mission-Potrero-Bernal Heights
8	Twin Peaks-Upper Market-Western Mission
9	South Bayshore
10	Outer Mission
11	Inner Sunset
12	Outer Sunset
13	Lake Merced

*In order to achieve a more refined distribution of travel in terms of natural corridors, zone 5 has been divided into two sub-zones. The division of data on travel furnished by BATSC has been made on the basis of 1960 census population.

SAN FRANCISCO BATSC ZONES



For purposes of analysis of downtown-oriented travel, BATSC zones 1 and 2 are used to define a somewhat enlarged downtown area. These zones include, in addition to the downtown core, Civic Center, Nob Hill, Chinatown, and other residential areas west and north of it, and the mixed commercial-residential area south of Market Street to Townsend and China Basin. The remaining eleven San Francisco zones are grouped into four corridors for analysis of downtown-oriented travel.[1]

Corridor for Downtown-Oriented Travel	BATSC Zones
Mission-Bayshore	7, 9, 10
Twin Peaks-Sunset	8, 11, 12, 13, 5b
Richmond-Western Addition	5a, 6
Marina	3, 4

The suburban counties are grouped into three corridors for both downtown and non-downtown travel on the basis of the direction of travel:

Corridor	Counties
East Bay	Alameda, Contra Costa, Solano, Napa
Peninsula	San Mateo, Santa Clara
North Bay	Marin, Sonoma

The analysis of interdistrict travel by purpose within the city is based on the BATSC zones themselves since no other data is available.

The data available from BATSC tapes provide the most comprehensive information available on existing (1965) trip demand by generalized origins and destinations. The data include choice among modes of travel[2] and purpose of each trip. The major limitation of the data is the reliability of the small sample in describing the overall population. In order to check the data's reliability, information provided by other studies, where comparable, has been used. These studies are described below.

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[1]See map, p. 66.

[2]Numbers of vehicular trips are assumed to equal automobile trips since travel by taxi, truck and other non-transit vehicles in terms of numbers is minimal.

2. Downtown Parking and Traffic Survey (DPATS) Cordon Count

A cordon count of all persons and vehicles entering and leaving an area defined as the Metropolitan Traffic District (MTD) by all routes and all modes was made by the Department of Public Works in 1965 as part of the on-going Downtown Parking and Traffic Survey (DPATS). The counts were taken between 10 a.m. and 6 p.m. and listed by half-hour periods. Both vehicle and person trip counts were taken.

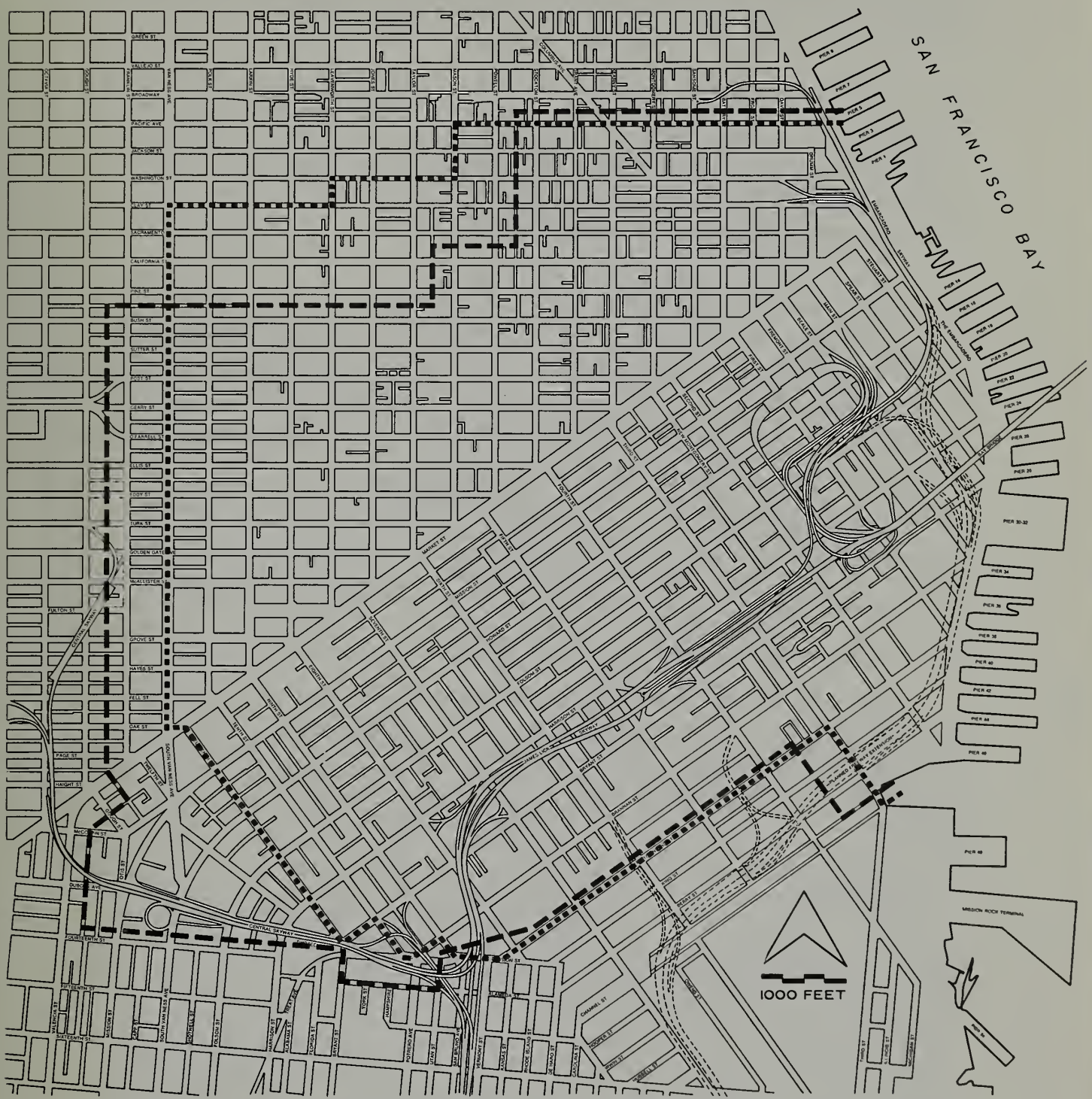
The boundary of the MTD used for this survey is similar to the downtown area defined by BATSC zones 1 and 2. Therefore, the results of the cordon count can be compared with the results of the BATSC survey for downtown-oriented travel, although some discrepancies would normally arise from seasonal variations, sample errors in the BATSC data, differences in counting procedures, and minor boundary differences. For purposes of this report comparisons have been made between the BATSC 4 to 6 p.m. origin and destination data and the cordon counts during the same period in order to 1) check the BATSC data for accuracy; 2) estimate the actual routing of trips tabulated by BATSC and DPATS, and 3) obtain the number and percent of trips passing through downtown and not accounted for in BATSC data for the corridors analyzed.

For most corridors the DPATS and BATSC data are generally in agreement once through trips are accounted for. Discrepancies between BATSC and DPATS data on transit travel for the Mission-Bayshore corridor are a result of the routing of the "M" and "K" streetcar lines out Market Street for destinations in BATSC zone 10. Another problem in comparing DPATS and BATSC data arises for this corridor and the Peninsula corridor because it is not easy to separate city-destined and peninsula-destined travel in the cordon counts.

A large difference between BATSC and DPATS data occurs for trips assigned to the Richmond-Western Addition corridor during the evening peak period. The most likely causes for this, apart from the variability of non-San Francisco or non-downtown-originated through traffic passing the cordons on Van Ness, Franklin and Gough, are inclusion of trips passing through the corridor with destinations in other corridors and intradistrict travel in the Western Addition. The cordon counts include some traffic passing the cordon between Franklin and Gough which turns south at Gough, Divisadero and Masonic to Twin Peaks. Other trips passing the cordon are autos bound for Marin County via Park Presidio Boulevard.

Significant differences also exist for the Marina and North Bay corridors which makes comparison difficult. Some

DOWNTOWN TRAFFIC DATA BOUNDARIES



Boundary of DPATS Cordon Count (Metropolitan Traffic District)

BATSC Zones 1 and 2 (Downtown)

of the difference is accounted for by the fact that the DPATS boundary includes trips to Nob Hill residences which are considered intradowntown trips by BATSC. In addition there are trips passing the cordon line which do not originate in BATSC downtown zones.

While the more detailed BATSC origin-destination information provides the basis for downtown-oriented travel analysis in this report, the DPATS cordon count provides a useful check on that data. The latter is also used to allocate trips to specific routes and thus provide a comparison with traffic flow maps prepared by the Department of Public Works.

3. Traffic Flow Maps of the Department of Public Works

The Department of Public Works (DPW) prepares maps of traffic flows throughout the city based on vehicular counts made every few years for the twenty-four hour period and the afternoon peak hour. These maps, along with information from DPATS, provide the basis for analysis of vehicular traffic generated by downtown during the afternoon peak period. In addition, these maps are the only source of information on 24-hour vehicular movements. The traffic flow maps are relied upon, with the DPATS vehicle route data, for description of vehicular traffic, primarily automobiles, for both downtown-oriented and interdistrict travel throughout the day and during the afternoon peak period.

4. Northern California Transit Demonstration Project (NCTDP)

The final report of the Northern California Transit Demonstration Project, Coordinated Transit for the San Francisco Bay Area - Now to 1975 (Simpson & Curtin) provides data on travel habits of Bay Area and San Francisco residents, which provide useful supplementary information for this report. Most of the information provided by that project was on transit usage and, therefore, it can and has been used to supplement and check BATSC and DPATS figures. The only information available on the means of access to and from transit (walk, transfer, auto) for Muni riders by areas of the city is provided in this study. Such information has proved useful in understanding the effect of transit service on transit usage in various neighborhoods. The data are available by districts formerly used by the Department of City Planning. These districts are similar, although not identical, to BATSC zones, offering limited but useful comparisons. NCTDP data on use of transit, both local and suburban, provide supplementary information on the relative use of transit for different trip purposes, thus indicating its adequacy in serving various needs in different locations.

NORTHERN CALIFORNIA
TRANSIT DEMONSTRATION PROJECT ZONES

1. CENTRAL BUSINESS DISTRICT
2. RUSSIAN HILL-NORTH BEACH
3. MARINA
4. RICHMOND
5. WESTERN ADDITION
6. BUENA VISTA
7. POTRERO
8. MISSION
9. SOUTH BAYSHORE
10. WEST OF TWIN PEAKS
11. SUNSET

5. Marin County Ferry Study

Because the NCTDP study only included the East Bay and San Francisco (plus Daly City) in its study area, it did not provide information on North Bay commuting. The study by Arthur D. Little, Inc., Feasibility of San Francisco-Marin Ferry Service, prepared for the Marin-San Francisco Water Transportation Study Committee provided information on the travel habits, residential locations and work destinations of Marin County commuters, thus supplementing and providing a check on BATSC home interview data. Downtown was defined differently from BATSC zones 1 and 2 or the MTD. Although this fact made comparison difficult, the areas were similar enough to allow for use of this additional information.

APPENDIX C -- SUPPLEMENTARY TABLES ON NONRESIDENT TRAVEL FROM THE BAY AREA INTO THE CITY

Table C-1

ESTIMATED TRIPS TO SAN FRANCISCO FROM OTHER EIGHT BAY AREA COUNTIES, AVERAGE, WEEKDAY, 1965

Purpose/Destination	Auto	%	Transit	%	Total	% Purpose & Destination
Work Person Trips						
Downtown	58,955	61	36,979	39	95,934	31
Non-downtown	76,566	91	7,877	9	84,383	28
Total	135,521	75	44,856	25	180,317	59
Non-work Person Trips						
Downtown	30,652	81	7,103	19	37,755	12
Non-downtown	79,970	91	7,811	9	87,781	29
Total	110,622	88	14,914	12	125,536	41
Total Person Trips						
Downtown	89,607	67	44,082	33	133,689	44
Non-downtown	156,476	91	15,688	9	172,164	56
Total	246,083	80	59,770	20	305,853	100

Source: Bay Area Transportation Study Commission computer tabulations.

Table C-2

ESTIMATED TRIPS TO SAN FRANCISCO FROM
THE EAST BAY, AVERAGE WEEKDAY, 1965

Purpose/Destination	Auto	%	Transit	%	Total	% Purpose & Destination
Work Person Trips						
Downtown	22,589	56	17,848	44	40,437	39
Non-downtown	22,531	92	1,923	8	24,554	24
Total	45,120	69	19,771	31	64,991	63
Non-work Person Trips						
Downtown	13,754	83	2,377	17	16,131	16
Non-downtown	18,920	87	2,763	13	21,683	21
Total	32,674	86	5,140	14	37,814	37
Total Person Trips						
Downtown	36,343	64	20,225	36	56,568	55
Non-downtown	41,551	90	4,686	10	46,237	45
Total	77,894	76	24,911	24	102,805	100

Source: Bay Area Transportation Study Commission computer tabulations.

Table C-3

ESTIMATED TRIPS TO SAN FRANCISCO FROM
THE PENINSULA, AVERAGE WEEKDAY, 1965

Purpose/Destination	Auto	%	Transit	%	Total	% Purpose & Destination
Work Person Trips						
Downtown	24,834	59	15,284	41	40,118	25
Non-downtown	44,310	90	5,104	10	49,114	30
Total	69,144	75	20,388	25	89,532	55
Non-work Person Trips						
Downtown	13,650	83	3,710	17	17,360	11
Non-downtown	51,841	93	4,262	7	56,103	34
Total	65,491	90	7,972	10	73,463	45
Total Person Trips						
Downtown	38,484	69	18,994	31	57,478	35
Non-downtown	96,151	92	9,366	8	105,517	65
Total	134,635	83	28,360	17	162,995	100

Source: Bay Area Transportation Study Commission computer tabulations.

Table C-4

ESTIMATED TRIPS TO SAN FRANCISCO FROM
THE NORTH BAY, AVERAGE WEEKDAY, 1965

Purpose/Destination	Auto	%	Transit	%	Total	% Purpose & Destination
Work Person Trips						
Downtown	11,532	75	3,847	25	15,379	38
Non-downtown	9,725	92	850	8	10,573	26
Total	21,257	82	4,697	18	25,954	64
Non-work Person Trips						
Downtown	3,248	76	1,016	24	4,264	11
Non-downtown	9,209	92	786	8	9,995	25
Total	12,457	87	1,802	13	14,259	36
Total Person Trips						
Downtown	14,780	75	4,863	25	19,643	49
Non-downtown	18,934	92	1,636	8	20,570	51
Total	33,714	84	6,499	16	40,213	100

Source: Bay Area Transportation Study Commission computer tabulations.

CITY AND COUNTY OF SAN FRANCISCO

DEPARTMENT OF CITY PLANNING

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